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RECENT ASPECTS OF NERVOUS AND MENTAL PATHOLOGY*

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The pathology of the nervous system has heretofore and in a large measure occupied a place by itself, that is, a place apart from pathology in general. Recent developments, however, have shown that only in a limited sense is this justified. Many of the organic diseases of the nervous system—some of its neoplasms and system diseases—must of necessity occupy a separate and distinct position, but is this true of the functional diseases and especially of those which are classified as mental? Are not the phenomena of the latter to be included in the general pathologic processes going on in the body as a whole? Let us see what the facts indicate.

First, the various functions of the human organism, digestion, nutrition, the maintenance of the bodily temperature, the production of nervous and muscular energy are all the expression of chemical processes; secondly, these chemical processes, manifold and complicated, are intimately correlated. It is the derangement of these processes that constitutes disease. Such derangement may arise spontaneously through some fault in the makeup of the individual, or it may be secondary to some disturbing cause introduced from without, such as a poison or infection.

Disturbances of the metabolism of the body, no matter how arising, necessarily entail states of intoxication and in these states of intoxication must be sought the explanation of nervous and mental disorders. Even many of the affections which we classify as organic, for instance, the system diseases, owe their inception to the presence of toxic substances, and the subsequent death of systems and tracts is to be looked on merely as a terminal state. It is, however, especially in the so-called functional nervous affections (and among these the mental affections are to be included), that the recognition of the factor of intoxication is important.

Time will not permit us to recall the various theories of toxicity that have from time to time appeared in the history of medicine. Such theories appear in Hippocrates, were advocated by Pinel, Esquirol and Morel and in more recent times by Mendel and by Bouchard and his school. Although numerous and interesting facts were discovered, the existing knowledge of physiologic and chemical processes was not sufficiently advanced to enable medical men to interpret them correctly or to assign them a proper value, and because the studies proved disappointing the field was for a time neglected. That poisons do play a rôle, however, in the production of nervous and mental disease became evident from the subsequent and rapidly accumulated knowledge as to the rôle played by poisons introduced from without, notably alcohol and the infections. In regard to alcohol it became known not only that it may bring about diseased states in various of the viscera, but also that it may bring about inflammation of the nerves, and, in addition, disturbed mental states consisting of delirium, confusion and stupor. As regards the infections, Regis and later Kraepelin pointed out that they also were responsible for both nervous and mental symptoms. Kraepelin was one of the first to insist that in infections mental symptoms are the result of the action of bacterial toxins. These toxins, it would appear, may act directly on the brain, or the infection may bring about disturbances in the function of other organs, disturbances leading to changes in the general metabolism of the body, to the formation of endogenous toxins and a consequent general autointoxication. Infections variously involve the liver, the kidneys, the thyroid, the adrenals and other glands and tissues. The fact of such involvement is based on indisputable clinical and pathologic evidence. That under such circumstances an intoxication may be very complicated and very persistent can be readily understood. The prolonged confusions that now and then occur during the convalescent periods of typhoid fever and other acute infections, the prolonged confusional insanity every now and then encountered in alcoholism, are clearly due not to the original infection, not to the poison originally ingested, but to the secondary toxemia of a deranged metabolism. The confusional insanity of alcoholism, for instance, lasts, as we all know, for many months after alcohol has ceased to be ingested, and there is no escape from the conclusion that in such cases the symptoms are due to secondary intoxications.

These ideas must necessarily influence our conceptions as to the nature and origin of primary autointoxication, that is, of endogenous poisoning. A moment's reflection reveals that primary autointoxication is of two kinds; first, one that is gastrointestinal in origin, and, second, one that arises in the tissues of the body itself. In the normal or healthy individual, intestinal poisons are destroyed by the liver, the thyroid and by other glands and by the tissues generally, or they are eliminated by the various excretory organs. Poisoning of the nervous system is thus effectively guarded against. In diseased and defective organisms, however, invasion may occur, and the nervous system may suffer both from this primary

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intoxication and from secondary disturbances of metabolism due to derangements of the function of the liver, the thyroid gland or other structures. On the other hand, intoxications having their origin within the body proper may be followed by a secondary intestinal intoxication; as in melancholia, in which in consequence of the diminished innervation and changed secretions, toxic materials may form in the intestinal tract.

From whatever aspect the subject is approached the problem presented is that of an intoxication in which disturbances of metabolism play the essential rôle. It is the nature of the intoxication which first claims our attention. The long duration of mental diseases points clearly to the fact that these poisons cannot be of a character such as to permit of elimination, at least not of ready elimination. Bouchard taught that the organism is a laboratory of poisons and this as much in the normal as in the pathologic condition. In the normal condition these poisons are in one way or another made harmless, but in diseased states, when the protective measures of the organism are weakened, these poisons were supposed to circulate in the blood and to be excreted by the urine. Bouchard, it will be remembered, worked out a method of determining the degree, that is, the coefficient of the toxicity of the urine, a method which later found application also in the study of the toxicity of the serum. Our knowledge of physiologic and chemical processes, however, was not sufficiently advanced in his day to permit of a correct interpretation of the results. The profound interest which these studies aroused was equaled only by the disappointment which in due course and necessarily followed. We all remember the extensive rôle that was at one time assigned to the uric acid group, a rôle that still demands consideration. It was at first believed that the presence of leukomains—as they were termed—in the urine was sufficient to account for the symptoms of a given case. All that it seemed necessary to do was to further the elimination of these poisons, or to prevent their formation, or in some way to render them harmless; but, as we have seen, these expectations were doomed to disappointment. This was also true of the more elaborate studies made of the urine. The amount of nitrogen, sulphur and phosphorus excreted, the mineral waste and the output of water were all facts of interest; but they dealt largely with the end-results of metabolism and were obviously secondary to various recondite changes within the body.

An increasing knowledge of insanity has gradually indicated another view as to the nature of the toxicity in insanity. The clinical histories of many mental diseases—for example, of melancholia—consist of a period of gradual invasion, another period of maximum onset of symptoms and a third period of gradual subsidence. These facts suggest that we have to do with biochemical processes akin to those of infection and immunity, processes fermentative or enzymotic in their nature. In the prolonged intoxications encountered in mental disease the organism doubtless has recourse to the formation of immune bodies; that is, the organism reacts to intoxications just as it does to infections, namely, by a defensive fermentation. The rôle that the fluids of the organism play in its protection we have been taught by Buechner, Bordet, Bouchard, Behring, Roux, Kitasato, Ehrlich and others. The agencies at work have been shown to be substances which bring about immunity by a biochemical action, an action that is probably reducible to physicochemical terms. In combating the poisons which give rise to nervous and mental disorders, the phagocytes have, it would seem, no opportunity for the exercise of their special function, but it is not improbable that they join the serum of the blood in furnishing protective substances. The truths revealed in the discovery by Behring and Roux in regard to the curative and preventive action of the serum of animals immunized to diphtheria, in the discovery by Kitasato and Behring of the kindred facts in regard to tetanus and by Simon Flexner in regard to cerebrospinal meningitis, constitute stories of brilliant human achievement. Ehrlich's results in regard to ricin and abrin and Calmette's in regard to cobra poison are likewise familiar to us all. Nor need we call attention to the specific serums developed against definite microorganisms, the bacteriolytic serums or to the serums developed as defensive agents to erythrocytes, the hemolytic serums, or to the numerous other cytolytic and cytotoxic serums that have been experimentally produced. The doctrine of antigens and antibodies is destined, it would appear, to have an ever-widening application. An antigen is, as we all know, a substance which when introduced into the organism brings about the formation of a specific antibody. Among such substances are micro-organisms, their toxins, cells of various kinds or extracts of their substances, poisonous and nonpoisonous proteins and lipoid substances. Obviously, other facts, such as those of precipitation, agglutination, opsonin reaction and complement binding, must, like those of antigens and antibodies, be expressive of fermentation. Probably there is a common biochemical or physicochemical action basic to all of these phenomena. Certainly all of the processes of nutrition, all of the changes exhibited by proteins and carbohydrates, are the expression of such action and occur under the influence of catalytic and enzymotic processes. Again, the fact that ferments consist of two basic substances, first, a zymogen and, secondly, an activator, goes far to prove the identity of fermentation and immunizing processes. Again, just as antigens lead to the formation of antibodies, so do ferments lead to the formation of antiferments, and, finally, ferments likewise manifest the property of specificity, that is, each ferment is active on a specific substrate.

The aspect of the subject of fermentation developed by Abderhalden depends on the fact that a foreign protein substance introduced into the blood excites the production of a ferment the action of which is to protect the organism against the foreign substance. Such a foreign substance may gain access to the blood from without or from organs and tissues within the body. An instance is the digestion of placental elements by ferments in the blood of the pregnant woman, the blood of nonpregnant women and of men containing no such ferments. Abderhalden and his pupils have already done a very large amount of work on this subject but we must content ourselves with the statement that Fauser and others have tested the digestive or reducing action of the serums of different forms of insanity in relation to the thyroid gland, the sex glands, the brain, the kidneys and other organs. Many remarkable observations have been made.

Three general statements in regard to the processes of fermentation appear to be justified: First, proteins

and lipoids alone can evoke the formation of antibodies; in this process lipoids appear to play the rôle of activators, and their injection seems to bring about an increased formation of immune bodies. Second, the specificity of immunity and fermentation processes does not appear to be entirely absolute. It appears that the curative action of a given serum depends on its containing a larger amount of substances already normally present in the body. Third, in the struggle with intoxication and autointoxication, a most important rôle must be assigned to the glands of internal secretion. The various other tissues and organs of the body, in addition to their special functions, possess also the function of internal secretion inasmuch as they elaborate, as a result of their functional activity, and pass into the blood and other liquids of the body, certain substances which in one way or another act on other organs and thus add to the number of the hormones as we now term them. The life of the organism is that of a well-coordinated chemical whole. It is the disturbance of this coordinated chemical whole either by the introduction of foreign substances from without, or by the breeding of foreign substances within the body through the breaking down of the coordination, that causes intoxication, and it becomes clear that disturbances of metabolism, using this term in its widest sense, are the basic factors in mental diseases. How such disturbances of metabolism arise we have already indicated in the instance of the infections and poisons introduced from without. If the organism be essentially defective, deviate and aberrant insanity may of course arise without the influence of any external agency. The peculiarities presented by the defective organism are innate and often hereditary. Further they do not commonly manifest themselves in a marked degree until the period of life is reached in which metabolism assumes a special activity, namely, puberty or later. At this time, the sexual glands and with them all other glands of internal secretion and hormone producing structures and tissues take on a new rôle, enter on a new chemistry, and if the organism be badly constructed this chemistry becomes aberrant and toxic; for instance, in dementia praecox the sex glands appear to furnish materials directly toxic to the organism—that is, materials which act as foreign bodies and assume the rôle of antigens—while the defensive ferments, the antibodies, produced are in turn destructive in their action on the nervous system. In the manic-depressive group we have to do apparently with a somewhat simpler interplay of antigens and antibodies, but time forbids a further consideration of this interesting subject. Suffice it to say that in this group in which the picture is one of the predominance of antigens in the early stage—in an attack of melancholia or mania as the case may be—and of the predominance of antibodies in the later stage, it is by no means impossible that serums will be devised which will enable us to cut short such attacks and perhaps to practice preventive immunization for recurrences. It is with regard to the heboid-paranoid group, the great group of dementia praecox and paranoia, that the outlook is the most discouraging. Even here, however, it is not impossible that a fuller understanding of the problem will finally enable us to master the field; but if this is ever to be accomplished, it is only, I am firmly convinced, by further discoveries in the field which I have here so imperfectly outlined.

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THE PROGNOSIS OF CONGENITAL CLUBFOOT

AND ITS RELATION TO NONOPERATIVE TREATMENT*

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It has been truthfully said that a bad clubfoot is a stigma on the medical community in which its possessor has been reared. While there are today fewer opportunities for such condemnation than in the past, yet badly deformed and even untreated cases may be seen, and partially cured and relapsed feet are all too common. Such being the case, pertinent questions naturally arise in the consideration of every clubfoot. What is the outlook for form and function? If a good result is to be expected, how long will it take? What form of treatment should be employed, and how practicable will it be? For the physician not especially trained, such questions will be difficult to answer; even the man of experience will be guarded in his replies, for there are many factors entering into the result. What, then, is the prognosis of congenital clubfoot, and on what does it depend?

I. THE FACTORS IN PROGNOSIS

In the first place, it may be said that the general prognosis is steadily improving. This is largely due to the earlier recognition of the deformity by the parents, and to the fact that physicians are learning, surely if but slowly, that early treatment is essential for success. The value of the earliest possible treatment of these cases is almost axiomatic, and little need be said further than to emphasize it. While the rigidity of the foot is not always in direct proportion to the age, this is usually the case. In the early weeks of life the bones are soft, cartilaginous and plastic, the soft parts are easily stretched, and the earlier overcorrection is obtained, the sooner will reshapement and readjustment take place.[1] During the first year the growth of the foot is most rapid, and of this advantage should be taken.[2] As time goes on, all the tissues become firmer and more permanently adapted to their positions, whether right or wrong. Bones once calcified in a deformed position are difficult to reshape,[3] ligaments once shortened are always hard to stretch, and muscles which have become adapted to incorrect length and position are not easily activated.[4] If, moreover, correction is obtained in the first year, subsequent walking will become a further corrective rather than a deforming agent.[5]

The prognosis of congenital clubfoot might, then, be held to depend directly on the age at which treatment is instituted, and, other things being equal, this may be so. But the determining factors are usually neither the age nor the rigidity of the foot. These conditions on admission cannot be charged to the surgeon (unless, indeed, he has delayed treatment), and

* From the Orthopedic Department of The Children's Hospital, Boston.

1. Brackett: Tr. Am. Orthop. Assn., 1892, v. Silver: Interstate Med. Jour., 1911, xviii.
2. Brackett (Footnote 1). Judson: Am. Jour. Orthop. Surg., August, 1904.
3. Ryerson: Am. Jour. Surg., 1907, xxi, No. 3.
4. Wilson: Tr. Am. Orthop. Assn., 1892, v.
5. Judson: Tr. Am. Orthop. Assn., 1892, v.

future neglect of the parents in carrying out treatment may not be foreseen; but, aside from these two factors, the condition of the foot after treatment has once begun is the surgeon's direct responsibility, and thus the largest element in the prognosis falls directly on his shoulders. The proper selection of treatment and the persistency with which this treatment is carried out are the all-important factors in this one controllable element in the situation.

II. THE CHARACTERISTICS OF THE DEFORMITY

Before considering the question of selection of treatment and the relative advantages of the different forms, it may be well to review briefly the problem which confronts the surgeon. The two most common forms of congenital clubfoot are talipes equinovarus and talipes calcaneovalgus, the former constituting about 80 per cent. of all forms.[6] In both, there is a deformity of the foot in three planes, the foot in the former being held in plantar flexion, adduction and inversion, in the latter in the opposite deformity of dorsiflexion, abduction and eversion, the distortion being the most marked in this type in the one plane of dorsiflexion. In both, the deformity is entered into to a certain degree by all the structures of the foot, all the soft parts on the side toward which the foot is drawn being short and tight, while all the structures on the outer or convex side of the deformity are lengthened and relaxed.[7] While calcaneovalgus is largely a distortion characterized by changes in the muscles and ligaments, yet in all clubfeet of any marked degree the interrelations of the bones of the tarsus are considerably changed,[8] and in equinovarus especially, all the bones become altered in shape after calcification has begun.[9]

Not only are the anatomic difficulties great, particularly in the older and more rigid feet, and in those whose deformities have been complicated by previous treatment, but there is also another factor, less tangible but equally potent, which complicates the problem. This is the inherent tendency of clubfoot to relapse, an internal condition of tissue contraction which continues, and even seems to increase, after birth.[10] It is this active contractility and resiliency of the deformed foot which, more than any other one thing, makes the condition so hard to correct, or rather, to maintain corrected. It is evident that the treatment must be directed no less to the subjugation of this deforming tension than to the actual reshaping of the distorted anatomic structures.

In the study of cases of clubfoot as seen at the Children's Hospital, Boston, it has impressed the writer that, while all types and degrees of deformity are seen, most of the cases can be separated into two quite distinct groups. This distinction appears fairly early in the treatment, or at about 6 months of age in the untreated cases, and increases in degree rapidly as the case progresses. Into the first of these groups fall the flexible and early feet which have immediate and continued treatment, and into the second fall the older, more rigid feet, which have usually been neglected, or on which improper treatment has been instituted; therefore these groups represent, respectively, the feet which become overcorrected early and stay so, and those which are never well corrected, and are always relapsing and demanding further treatment. From this standpoint, then, the prognosis of a clubfoot may be considered to be directly dependent on the respective group into which it falls.

The treatment of congenital clubfoot has resolved itself during recent years into two somewhat different methods, both of which have their strong adherents. These are the operative or radical, and the manipulative, nonoperative or conservative types of treatment. Without discussing the merits of the two at this point, it suffices to say that it has also been the author's observation that most of the cases treated by operative, that is, cutting methods, have found themselves in Group 2, as defined above, and that the manipulated cases have largely claimed Group 1, with its obvious advantages.

III. REPORT OF CASES

It was with some curiosity as to how well this impression was founded, and as to the reasons for the existence of these relations, that the following examination of the records of about 200 cases of congenital clubfoot was undertaken. This group includes all cases admitted to the Children's Hospital between September, 1907, and January, 1913 (a little over five years), no case therefore having begun treatment less than two years ago. As no cases were reported which had received less than one year's treatment or observation in the clinic, the original number was reduced to 105 cases of equinovarus and ten of calcaneovalgus.

The general course of treatment carried out during this period was as follows: In the cases in which operation was performed, certain of the resistant structures were cut, and, their resistance having been removed, the foot was put in the corrected position with a certain amount of ease. In eighty operations on children with equinovarus, twenty-two of which were secondary to previous operations on the same foot, there were 109 tenotomies of the Achilles tendon, 14 of the tibialis posticus, 7 of the tibialis anticus, 2 of the extensor proprius hallucis, and 1 each of the flexor longus hallucis, flexor brevis hallucis and flexor longus digitorum. The plantar fascia was cut 80 times, the calcaneoscaphoid ligament 27, and the calcaneocuboid in 6 instances. There were 11 osteotomies with the removal of a bone wedge from the outer side of the dorsum, usually from the os calcis or astragalus. The most common operation was a tenotomy of the Achilles tendon with a plantar fasciotomy, to which was often added a division of the calcaneoscaphoid ligament, all these structures being cut subcutaneously. When suitable correction had been obtained, dressings were applied and the foot put up in plaster in the corrected position.

The nonoperative treatment consisted in manual manipulation of the foot, working slowly on all the contracted and distorted structures, and putting the foot up in plaster after each manipulation, these plasters being changed about every three weeks. In only three cases was ether given so that more forcible manipulation could be employed. Braces were used for the retention of these feet after overcorrection by plaster had been obtained, especially in the children old enough to walk. Similar braces were used in the cases with operation also, following the plasters applied at the time of operation.

6. Ehrenfried, Albert: The Occurrence and Etiology of Club-Foot, THE JOURNAL A. M. A., Nov. 30, 1912, p. 1940.
7. McKenzie: Tr. Am. Orthop. Surg., 1892, v; Am. Jour. Orthop. Surg., January, 1905.
8. Bankart: Clin. Jour., xli, No. 42.
9. McKenzie: Am. Jour. Orthop. Surg., January, 1905.
10. Schapps: Med. Rec., New York, Oct. 3, 1914.

In judging the results of these cases, it has been necessary for purposes of comparison to make four arbitrary classifications, into which practically all cases could be fitted. These have been designated A, B, C and D, and are as follows:

Class A (good results). Feet which are held straight, are flexible and overcorrectible, are apparently normal in form and function, and require no apparatus.

Class B (fair results). Feet which are manually correctible but not overcorrectible, that is, with no marked deformity, but possibly a little stiff, both form and function being good. Some of these feet still use a lift or brace.

Class C (poor results). Feet held in deformity, with some rigidity, but possible to correct manually with force. This group includes the common result of good function with adduction of the forefoot and inversion of the os calcis. It also includes a few cases in which operation was performed recently, in which the results are apparently satisfactory but not enough time has elapsed to judge the end-result.

Class D (bad results). Feet held in definite and marked deformity, rigid and not correctible, and requiring further corrective treatment. This class includes a few cases in which operation was recently performed with questionable results.

Of the 105 cases of equinovarus, 60 were double, giving a total of 165 deformed feet, each foot being considered a separate case hereafter. For the total number the results were: Class A, 37; B, 79; C, 42; D, 7, about 70 per cent., therefore, being satisfactory (Classes A and B). A comparison of the cases in which operation was performed and the cases in which operation was not performed for different lengths of treatment, with the percentage of satisfactory and unsatisfactory results in each group, is shown in Table 1.

TABLE 1.—RESULTS IN CASES WITH AND WITHOUT OPERATION FOR DIFFERENT LENGTHS OF TREATMENT

	Groups					
	A	B	Per	C	D	Per
Equinovarus:	No.	No.	cent.	No.	No.	cent.
Result of all cases seen one year or more after admission.						
With operation	12	43	55	38	7	45
Without operation	25	24	94	3	0	6
Results two or more years after admission.						
With operation	10	36	55	31	7	45
Without operation	24	16	95	2	0	5
Results three or more years after admission.						
With operation	9	30	55	27	5	45
Without operation	24	12	95	2	0	5
Calcaneovalgus:						
Results, all cases	3	2	31	9	2	69
Results, with operation	0	1	17	3	2	83
Results, without operation	3	1	40	6	0	60

From this it would appear that in equinovarus there is considerable difference between the results of the cases in which operation is performed and the cases in which operation is not performed, the former being almost evenly divided between satisfactory and unsatisfactory, while the latter are practically all satisfactory. The results are apparently not influenced by variations in the interval from the time treatment was begun to the date of the observation of the foot. The ten cases of calcaneovalgus, though a small number from which to draw conclusions, still further bear out this contention, for although few of these results are so good as in equinovarus, yet the cases in which operation is not performed here also seem to have a far better outlook.

A comparison of results in relation to the age at which treatment was begun, with the operative and nonoperative results for each division, may be seen in Table 2, taken from the group which was investigated at a period two or more years after admission (126 feet).

TABLE 2.—RESULT IN RELATION TO AGE

	Groups					
	A	B	Per	C	D	Per
Equinovarus, two year group:	No.	No.	cent.	No.	No.	cent.
Admitted under two months	7	17	63	10	4	37
With operation	0	12	48	9	4	52
Without operation	7	5	92	1	0	8
Two to six months old	15	12	77	7	1	23
With operation	4	8	62	6	1	38
Without operation	11	4	93	1	0	7
Six months to one year	8	4	67	6	0	33
With operation	4	3	55	6	0	45
Without operation	4	1	100	0	0	0
Over one year	4	19	66	10	2	34
With operation	2	13	56	10	2	44
Without operation	2	6	100	0	0	0

It is apparent that the general results do not differ appreciably with the age when treatment was begun, but that the proportion of satisfactory results in the cases in which operative treatment is not employed greatly exceeds that of the group with operative treatment in every instance. The treatment, then, and not the age, has evidently been the determining factor. Moreover, there were fifty-four relapses recorded in the series, only three of which were found to be in patients receiving no operation, and in these the relapses were traced to neglect of the parents in carrying out the prescribed treatment.

The criticism may be made that the majority of the cases given operative treatment were at all times worse

TABLE 3.—COMPARISON OF SIMILAR CASES

		From two year group, equinovarus				
		Number	Results	Number	Results	
Age	Type	Cases With Operation	Cases With Operation	Cases Without Operation	Cases Without Operation	
1 week	3	2	B-C	2	B-B	
4 weeks	2	2	B-B	3	A-A-C	
4 weeks	3	3	C-C-D	2	B-B	
6 weeks	2	2	B-C	6	A-A-A-B-B-B	
6 weeks	3	8	A-A-B-B-C-C-C-C	1	A	
8 weeks	3	3	B-B-C	1	B	
3 months	3	7	A-B-B-B-C-C-C	4	A-A-A-C	
12 months	3	1	B	1	A	
13 months	3	2	B-B	1	B	
15 months	3	4	B-B-B-C	1	B	

	A	B	Per	C	D	Per
Total above	No.	No.	cent.	No.	No.	cent.
With operation	3	17	60	13	1	40
Without operation	10	10	90	2	0	10

than those treated without operation, or, in other words, that the prognosis of the former was never so good as for the latter. To meet such criticism, all the cases from the operative group, which at admission corresponded in age and type of foot to any admissions in the nonoperative group, were selected and compared with the latter cases. The individual cases of both groups with their results are tabulated in Table 3.

As these constitute all the cases of the same age and in the same condition at admission, of which part were treated with operation and part were not, these figures, corresponding closely to those previously given, show even more conclusively the preponderance of good results in the cases in which operation was not performed. It hardly seems possible that these figures could be due to chance, or to the fact that all these particular cases with operation developed unfavorable conditions, which were not referable to the treatment

itself. There were, moreover, among these operative cases, twelve in which operation was performed immediately on admission, and were, consequently, purely operative throughout. The results of these, compared to the eight nonoperative cases of the same age and type at admission, are given in Table 4.

TABLE 4.—COMPARISON OF OPERATIVE AND NONOPERATIVE CASES

	A No.	B No.	Per cent.	C No.	D No.	Per cent.
Cases with operation at first visit..	0	10	83	2	0	17
Cases without operation of same age and type	4	3	88	1	0	12

While the proportion of satisfactory nonoperative results is not so great as in the previous tables, it will be noticed that there were no results of Grade A in any of the operative cases, whereas half of the nonoperative cases had a perfect result. Judging from these figures, it would appear that if two patients of exactly the same age and condition were treated, one by operative and one by nonoperative procedures, the prognosis of the two would greatly differ, and would be decidedly in favor of the cases without operation. While undoubtedly satisfactory results have been obtained in some of the cases operated upon, yet the preponderance of cases not operated upon with almost perfect restoration to normal is unmistakable.

IV. CONSIDERATION OF THE OPERATIVE METHOD

Assuming, then, that these figures are of significance, to what can we attribute the poorer results in the cases with operation. Is there an explanation for these facts which will leave little room for doubt that the foregoing statistics represent the relative values of the two methods of treatment? Can we not discover some primary defect in the operative method that will account for this difference?

The essentials in any method of treatment of clubfoot are, first, full correction, or better, overcorrection of the deformity, and second, perfect retention in the overcorrected position until the structures have become so adapted to their new relations that they will hold themselves corrected. Now it will be noticed, in addition to the comparatively worse results shown above, that in over one third of the cases having operation a second operation had to be performed, and also that in over half of these cases there were relapses, while in only three of the cases without operation were there relapses, for none of which latter was treatment responsible. The elements of relapse are, broadly speaking, two, namely, failure to obtain sufficient correction, and failure to maintain the correction obtained.[11] If operation is depended on for correction, and full correction is not obtained, a relapsed condition practically exists from the beginning.[12] If, on the other hand, good correction is obtained, only a small part of the treatment has then been accomplished, for there are many factors operating to reproduce the deformity, such as short contracted ligaments, deformed and elastic bone,[13] and unequal muscular pull.[2] Home neglect, imperfect apparatus,[14] failure to maintain the overcorrection day and night for a sufficient period,[15] and failure to stimulate and regulate muscle balance by massage and exercises[16] are potent factors in the relapse of a well-corrected foot. All of these may have entered into the cases in which relapses have been reported, yet there is at first sight no more reason to expect a failure of retentive measures in the cases with operation than in those without operation, the indications for after-care being the same in each group. It would, then, be natural to infer that in the former group there is also in operation the first of the two elements of relapse, that is, there is failure by operative methods to obtain perfect correction. It is true that, by cutting whatever structures resist correction, an apparently perfect foot would seem to be obtained at one sitting. But is it not possible that here appearances are deceptive, and that the foot is really far from complete correction? Let us consider some of the reasons why this might be so.

In the first place, there are certain well-known conditions existent in many orthopedic clinics, which, though avoidable, are too constant to be disregarded. If operation is relied on as the means of correction of a clubfoot, however perfect this correction may be, the operation itself can be only an incident in the treatment,[17] as has been previously noted. Men who operate on these feet are too prone to be overconfident of results and to neglect the equally important after-care, a circumstance which rarely arises in the manipulative treatment, as in this no one corrective procedure is preeminent. As a matter of fact, the case having operation should be the more carefully watched, because it is much more difficult to hold the foot recently operated on in plaster in proper correction on account of the dressings which must be applied over the incisions. Frequently patients whose deformity has been apparently well corrected at operation return to the outpatient clinic with an already relapsing foot, because of the loss of fixation in a too-roomy cast. Another equally potent factor which operates against this treatment is the unfortunate condition which necessitates that the management of the case be shifted from one man to another, no one of whom takes the whole responsibility or is fully conversant with the case and its requirements, and few of whom have the same principles and technic of treatment.

These conditions attending the operative treatment of clubfoot, however, undesirable as they may be, are largely preventable with care and skill, and do not conclusively disprove its value. There is yet another reason for these unsatisfactory results, easily understood on examining the distorted foot. The deformity of equinovarus is not localized at any one joint, but is entered into by all the structures of the foot.[18] Not only are all the soft structures on the inner side short and on the outer side long, but also all the bones are changed in shape, and each bone of the tarsus is dislocated inward on the bone or bones immediately behind it.[18] No one tissue or part being at fault,[19] treatment must be directed to the whole foot,[18] not localized as it must necessarily be by operation,[20] which thus gives an apparent rather than a real correction.

Moreover, there are many definite objections to operation. Aside from the usual risks of anesthesia, sepsis and possible mortality in bone operations,[21] oper-

11. Eikenbary: Northwest. Med., 1913, v, No. 4.
12. Townsend: Tr. Am. Orthop. Assn., 1892, v. McKenzie: Brit. Med. Jour., Nov. 10, 1906. Jones: ibid., Oct. 9, 1909. Bartow: Am. Jour. Orthop. Surg., May, 1910.
13. Savariaud: Presse méd., Sept. 7, 1912.
14. Bradford: Tr. Am. Orthop. Assn., 1899, i.
15. Wilson (Footnote 4). McKenzie: Tr. Am. Orthop. Assn., 1892, v.
16. Wilson (Footnote 4). Myers: Tr. Am. Orthop. Assn., 1893, vi.
17. Taylor: Tr. Am. Orthop. Assn., 1892, v.
18. McKenzie: Am. Jour. Orthop. Surg., January, 1905.
19. McKenzie: Tr. Am. Orthop. Assn., 1892, v.
20. Bankart C. (Footnote 8). Schapps: Northwest. Med., November, 1908, vi, No. 11.
21. Sayre: Tr. Am. Orthop. Assn., 1892, v. Wilson: Tr. Am. Orthop. Assn., 1893, vi.

ation is productive of scar tissue and ankylosis,[22] it impairs muscle power and equilibrium, interferes with growth[22] and development, and often increases rather than alleviates deformity. The contractility of scar tissue is well known, and is often a potent factor in relapse,[23] especially after the more destructive operations on the soft parts. Scar mats up the tissues and binds down the tendons, so preventing the long muscles of the leg, which during walking take their fixed point from the foot, from acting normally in locomotion.[24] Following tenotomy, muscle power does not wholly return,[25] for the retraction of the muscle belly impairs future contractility,[26] and in the case of the gastrocnemius, especially if cut on one leg only, often resulting in such deformity of the calf as to be a source of great embarrassment in the future.[27] Every removal of bone shortens an already short foot or leg,[28] and increases the future rigidity and inelasticity of the foot,[8] as well as weakening it.[7] Incision of nerves and vessels retards development,[7] and for every tendon that is cut, so much of the normal balance of the foot is lost for the future.[29] Furthermore, division of the contracted tissues removes a valuable leverage for the further correction and retention of the deformity, and a fulcrum for the reshapement of the bones and articular facets.[30]

V. CONSIDERATION OF THE NONOPERATIVE METHOD

Evidently surgery does not offer the ideal solution of the problem, and it is equally evident that the solution must lie in that procedure which will, as nearly as possible, restore the parts to their normal condition.[31] The foot is a delicate and complicated mechanism, and its artificial reconstruction must be cautious.[5] By the slower manipulative method, the gradual reshaping of the soft parts and bones alike may be produced without danger to the patient, without damage to any of the structures, without interference with the circulation,[32] innervation or growth, without loss of muscular power or balance,[30] and with an ultimate restoration of practically normal form and function. Correction is begun as soon as the patient is seen, without waiting for "the ideal operative age," [33] advantage being taken of the soft tissues, natural growth, and the recumbency of the infant, which avoids the deforming influence of walking on the partially corrected foot.[5] By holding the foot for a moderate time in the corrected or overcorrected position, it reshapes itself by growth,[34] and as this reshaping force is spread out over the whole foot, all the structures approximate normal, and the natural elasticity and vigor of the foot is preserved.[35] A long time is necessary to reshape the foot[36] by any method, and if the operative treatment is employed, a longer retentive stage must be expected, for the normal anatomy has not been restored as after more gradual correction. Moreover, the liability to relapse is less after the manipulative treatment,[37] since, after all the soft structures have become adapted to their new positions and the bones to their new static conditions, the intrinsic structure of the former and internal architecture of the latter will become permanently altered to meet their new requirements (by Wolff's law),[38] an alteration which is impossible to produce except after the long-continued molding process of correction which the usual operative treatment does not afford.

It is not the purpose of this paper to discuss the details of treatment, but a few words should be said further to elucidate the theory of manipulative treatment. By the employment of plaster of Paris after each manipulation, holding the foot in the position gained, pressure is made over the whole foot in a manner impossible with any form of apparatus.[39] The slight atrophy following this method soon disappears if proper correction and function have been obtained,[40] and decubitus may not be feared if proper care is exercised. For the routine application of this plaster, the technic of Ehrenfried[41] has been used, the present writer's modification of using a longer foot cuff which will raise the prolapsed cuboid, being recommended. Between the time full correction has been obtained, and the period of walking, a great deal of attention must be given the case, as this is the commonest period of relapse, and retentive apparatus, such as Bartow's elastic band,[42] or the leather cuff recently described by Schapps,[43] should be employed. At the walking age, the foot should be corrected and be actively overcorrectible, or walking should not be commenced. It must then be held in a light brace, preferably an inside upright attached to a tight-fitting shoe with outside lift on the sole, which allows muscular activity and the use of the body weight as a corrective agent.[18] A night plaster or brace should be worn for some time.[7] Massage and exercises are also indicated, though not so important as after operative treatment.

While most of the foregoing statements are based on a study of equinovarus, the same theory of treatment applies equally well to congenital calcaneovalgus, the principles of early treatment by manipulation, and plaster if necessary, followed by thorough retention, applying. The chief difference is that correction is easier and quicker to obtain, but that retention must be continued as long, if not longer, for a good result, a fact not usually recognized.

Retention of the overcorrected foot is a matter of detail and perseverance, correction of the foot is the element of variation, so that the prognosis to a large extent rests on its efficacy, other things being equal. That the prognosis may from this standpoint be considered good is indicated by the statistics in Table 5 of those cases of clubfoot admitted to the outpatient clinic of the Children's Hospital during the year from Dec. 1, 1913, to Dec. 1, 1914, which were treated by the writer with the nonoperative method exclusively. During this period, thirty-one children with equinovarus and seventeen with calcaneovalgus were admitted, but excluding all who did not return for further care, and those who had operation, there remain to report twenty-two with equinovarus, fifteen

22. Schultze: Arch. für Orthopadie, Band 3.
23. McKenzie (Footnote 18). Myers (Footnote 16). Soule: Am. Jour. Orthop. Surg., May, 1911.
24. Schnapps (Footnote 20).
25. Guaccero: Arch. di Orthop., 1909.
26. Steele: Tr. Am. Orthop. Assn., 1899, i.
27. Ryerson: Am. Jour. Orthop. Surg., April, 1906. Myers (Footnote 16). Guaccero (Footnote 25).
28. McKenzie (Footnote 12). Bartow (Footnote 12).
29. Heimannsberg: Arch. f. Orthop., vii.
30. Soule (Footnote 23).
31. Brackett (Footnote 1). Barnett: Am. Jour. Surg., June, 1909.
32. Stern: Am. Jour. Orthop. Surg., August, 1910.
33. Bradford (Footnote 14). Becker: Arch. f. Orthop., iv.
34. Judson (Footnote 2).
35. Willard: Tr. Am. Orthop. Assn., 1899, i.
36. Eikenbary (Footnote 11). Townsend (Footnote 12).
37. Brackett (Footnote 1). Bradford (Footnote 14). Vance: Tr. Am. Orthop. Assn., 1892, v.
38. Bloom: New Orleans Med. and Surg. Jour., lxii, 714. Levy: Tr. Am. Orthop. Assn., 1892, v.
39. Milliken: Tr. Am. Orthop. Assn., 1890, iii.
40. Herz: Arch. f. Orthop., vii.
41. Ehrenfried: Boston Med. and Surg. Jour., 1909, clxi, 741.
42. Bartow: Tr. Am. Orthop. Assn., 1894, vii.
43. Judson (Footnote 3). Townsend (Footnote 12).

being double (thirty-seven feet) and thirteen with calcaneovalgus, nine double (twenty-two feet). As the results of these cases, as shown in Table 5, were noted at the conclusion of the year stated above, it is evident that many of them had been under treatment but a short time when their condition was reported.

TABLE 5.—REPORT OF ONE YEAR'S TREATMENT

	Equinovarus 37 feet	Calcaneovalgus 22 feet
Average age of admission	3 mons. (7 days to one year)	11½ mons. (2 wks. to 2¼ years)
Average number of manipulative treatments	2¼	1½
Average number of manipulative and plaster treatments	2½	1
Average number of days until foot overcorrectible	34.7	33.
Average number of days until foot held straight	51.	
Average number of days until held overcorrected	53.	50.
Average number of days until braces advised	119.	6.
Result		
Group A: actively overcorrected	27	5
Group B: actively straight or passively overcorrected	10	5
Group C: not yet straight or passively overcorrected	0	12*

* Five of these patients did not continue treatment.

From this it appears that cases with equinovarus are easy of correction when treatment is begun in the first year, active overcorrection being obtained in an average time of less than two months and with about three plasters, demonstrating what nonoperative methods can accomplish. Calcaneovalgus, on the other hand, does not seem to have so good a prognosis, for while the time required for correction is much the same, and with fewer treatments, evidently it is harder to hold the correction obtained, judging from the results at the end of the year. In explanation of this, we should first note the greater age at admission, as most cases are not recognized until the walking age. For this reason, many were at once put into braces (explaining the short average interval to "braces advised"), and did not receive manipulation and plaster. That this is a mistake, and that more attention should be given these cases early, these figures apparently prove.

While the tables demonstrate the results of manipulative methods in infants only, it is the writer's belief that this treatment can be almost equally well adapted to older, more rigid feet, and to relapsing cases. During all of childhood the bones are plastic, much advantage may be taken of growth, and walking may be made an active force for correction. Other structural bony deformities, as scoliosis, are known to yield to persistent plaster redressment, even in much older cases. Indeed, many very satisfactory results have been reported from time to time, following the nonoperative treatment of older cases of clubfoot.[44] With the promise of a better ultimate result from noninterference with the anatomic structures and physiologic equilibrium of the foot, it would certainly seem justifiable to give it a fair trial.

SUMMARY

1. There are three factors in the prognosis of congenital clubfoot: the age and rigidity of the foot, neglect, and the method of treatment employed. Of these, the last is the one controllable and predicable factor.

2. Other things being equal, favorable prognosis is proportionate to the flexibility of the foot, which is usually in indirect proportion to the age of the child.

3. Absolute overcorrection of the foot, and unremitting attention to the maintenance of this position until the structures have become permanently readjusted, are essential.

4. The deformity being shared by all the structures of the foot, that treatment only which is not localized in its application is productive of uniformly satisfactory results.

5. The destruction of any tissues prevents the restoration of natural shape, strength and balance of the foot, and is prejudicial to the return of normal function.

6. The nonoperative or so-called manipulative treatment of clubfoot avoids these errors in treatment, and takes advantage of the plasticity and growths of the foot.

7. By the manipulative method, overcorrection of the foot is rapidly and thoroughly effected, and relapse is seldom seen.

8. By the manipulative method, almost twice as many cases show ultimate satisfactory results as do those with operation.

9. The manipulated cases are easy and practical of management, and overconfidence and carelessness are often prevented by the nature of the treatment.

10. Although the cases are rarely so severe, the prognosis for perfect result in calcaneovalgus is not so good as in equinovarus, largely because of delay in diagnosis, and failure to maintain overcorrection.

44. McKenzie (Footnote 12). Bartow (Footnote 12). Schultze: Arch. f. Orthop., vi. Smith: Detroit Med. Jour., 1909, ix. Hutchins: Am. Phys. Ed. Rev., 1914, xix, 8.

THE SUPRARENAL GLAND IN SHOCK*

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MINNEAPOLIS

The term "shock" usually brings to our minds a certain clinical syndrome consisting of mental apathy, reduced sensibility, vasomotor disturbance, weakness, pallor, subnormal temperature, rapid and thready pulse, and irregular respiration. Such a picture may be present in the severely burned individual, in the victim of a perforating ulcer, in the mangled railroad man, or in sepsis. Aside from these specific instances, we rarely see every symptom of the syndrome so exaggerated. In a broader sense we may still have shock, although some, or all, of the symptoms are mitigated or almost abated. For instance, during laparotomy the intestines in early shock lose their normal tone before blood pressure begins to fall. Persistent trauma may bring out the picture. It may be going too far to say that we may have shock without any symptoms, but it is very difficult often to tell when we get our first symptoms. To illustrate: We start to produce shock by the handling of the viscera of an animal; the first fifteen minutes of trauma produce no symptoms of shock; neither do the second fifteen minutes produce recognizable shock; but if this process is continued for several hours we finally produce the syndrome. Yet in doing this, the operator realizes that he is in some way dealing with a progressive affair.

The factors contributing to this syndrome are not easily recognized. Many authors attempt to explain

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shock on some one hypothesis. From the fact that none of the explanations clear all the phenomena, one is justified in believing shock to be composite depending on a number of variable factors. One of the factors that enters prominently into the composite of many forms of shock is concentration of the blood. Cobbett and Roy,[1] and to a lesser degree Sherrington,[2] have attempted to explain shock on the hypothesis of oligemia. This factor, important in itself, must be supplemented by other factors to make a universal application possible. The work of Henderson,[3] showing a loss of venous tone, attributed by him to deficient carbon dioxid, a damming up of the venous blood and an extravasation of the blood into the tissues is but stating the converse of Cobbett's explanation. Even when we combine the explanation of Meltzer[4] with these teachings we cannot get a full explanation of shock. I have often been impressed with the sudden collapse of an animal not well advanced in shock on the pinching afferent vagus areas in the peritoneum. This on our blood tracing revealed a sudden fall of blood pressure with cardiac slowing, exactly as obtains with vagus inhibition. Moreover, the effect can be annulled by cutting the vagi, or by atropin. Therefore, vagus inhibition seems an accessory shock factor.

Crile[5] and Dolly[6] explain shock through changes in the central nervous system with associated remote phenomena. In other words, the brain is a great storage battery in the kinetic system driving the suprarenals, the muscles, and through its action on the suprarenals the other important viscera. According to Crile, the suprarenals influence the direction of the blood supply, control the output of glycogen from the liver, inhibit intestinal function, and avert the blood from the viscera to the more insistent organs. As evidence of the central origin of shock, Crile shows work and exhaustion phenomena in ganglion cells. These are manifested by altered Nissl substance. This offers an ingenious explanation of many of the symptoms of shock, but does not seem to lend itself readily to laboratory demonstrations. Crile teaches that the liver overcomes acidosis.

That shock is in any way cardiac, or due to cardiac failure, as advanced by Boise,[7] does not seem even reasonable. In advanced shock the heart is still capable of pumping against an enormous resistance, as can be demonstrated by the injection of epinephrin.

Acidosis[8] is considered a shock factor. By the term "acidosis" I understand is meant retention of excessive amounts of some of the beta-oxybutyric acid derivatives by the tissues.[9] Such an accumulation, when no longer neutralized by ammonium or sodium compounds of the body fluids, may lead to clinical acidosis. In traumatic shock I have never been able to demonstrate any increase of ammonia in the urine such as should occur in beginning acidosis. Dr. McClendon by accurate hydrogen ion determinations could show no increase of hydrogen ion concentration in the blood in our cases of experimental traumatic shock. In obstructive jaundice, one of my students (Olga Hansen) has produced acidosis, and this has been confirmed by McClendon's blood examination. Crile produced marked acidosis by extirpation of the liver or of both suprarenals. Clinically, acidosis is important, and may be intensified by operative procedure. However, the relation to shock is not clear.

Last of all, I wish to introduce primary suprarenal exhaustion as a shock factor. Before discussing suprarenal depletion, I will review the action of epinephrin, the product of the medullary suprarenal.

The amount of epinephrin in the blood of a normal individual is very slight, somewhere between one part in two hundred millions, as determined by Hoskins,[10] and one part in ten millions, as determined by Waterman and Smit.[11] Further than this, the epinephrin output per minute per kilogram of dog cannot be above 0.2 c.c. of a 1:1,000,000 solution of epinephrin. The smallest amount of epinephrin that will have any effect on the blood pressure of a normal dog is 0.42 c.c. of the same solution. This amount produces not a rise but a fall of blood pressure, and the amount necessary to produce a rise is several times as much. These facts indicate that in the normal individual, just enough epinephrin is in circulation to maintain the tone of the "myoneural junction," as the pegs of a violin maintain the tension of the strings. Therefore, we have no right to say that the normal blood pressure is maintained by epinephrin in the blood, but rather that epinephrin sensitizes unstriped muscles of the vasomotor system to the sympathetics.[12] In addition, epinephrin has other functions than that of blood pressure control. Small doses relax the muscles of the alimentary canal, and at the same time close the sphincters; cause the bronchioles to dilate, and increase secretion of glands. According to Boinet,[13] Cannon and Nice,[14] epinephrin relieves fatigued muscles. Cannon[15] emphasizes the mobilizing power of epinephrin on sugar, the rôle of this sugar as an emergency food, and in addition the effect of the epinephrin on the coagulation of blood. Emergencies may call large amounts of epinephrin from the suprarenals to the circulation. Such forced output[15] of epinephrin produces a general rise of blood pressure, shifting the blood from the less insistent abdominal viscera to organs immediately essential to life, such as the lungs, heart and central nervous system, and under special conditions to the skeletal muscles.[16]

Intact splanchnic nerves are necessary to the function of the suprarenal medulla, according to Cannon,[17] Dreyer[18] and Elliott.[19] The last-named investigator shows that when the efferent nerves to the suprarenal gland are cut, there is no discharge of epinephrin on any sort of reflex stimulation. Further than this, the reflex center for the control of the epinephrin output is in the medulla somewhere in the bulb between the first thoracic nerve and corpora quadrigemina. Emotional fright (Cannon, Elliott), simple anesthesia, cerebral injury, excitation of nerves, and poisoning with toxins are effective in reducing the epinephrin content of the suprarenal medulla, and act reflexly through the

1. Cobbett and Roy: Quoted by Short.
2. Sherrington and Copeman: Jour. Physiol., 1893, xiv, 52.
3. Henderson: Am. Jour. Physiol., xxi, 126; ibid., 1909, xxiii, 345; 1909, xxiv, 66; xxv, 385; xxvi, 260.
4. Meltzer, S. J.: The Nature of Shock, Arch. Int. Med., July, 1908, p. 571.
5. Crile: Lancet, London, July 5, 1913.
6. Dolly: Jour. Med. Research, 1909, xxi, 95; ibid, 1910, xxii, 331.
7. Boise: Am. Jour. Obst., 1907, lv, 1.
8. Crile: Ann. Surg., January, 1915, p. 6; Canad. Med. Assn. Jour., January, 1915.
9. Levy, Magnus: Bull. Johns Hopkins Hosp., 1911, xxii, 239.
10. Hoskins, R. G., and McClure, C. W.: The Adrenal Glands and Blood Pressure, Arch. Int. Med., October, 1912, p. 343.
11. Waterman and Smit: Arch. f. d. ges. Physiol., 1908, cxxiv, 198.
12. Elliott, T. R.: Brit. Med. Jour., June 27, 1914, p. 1393.
13. Boinet: Compt. rend. Soc. de biol., 1895, xlvii, 273.
14. Cannon and Nice: Am. Jour. Physiol., 1913, xxxiii, 44.
15. Cannon: Am. Jour. Physiol., 1913, xxxiii, No. 4, p. 366.
16. Oliver and Schafer: Jour. Physiol., 1895, xviii, 240.
17. Cannon and de la Paz: Am. Jour. Physiol., 1911, xxviii, 64.
18. Dreyer: Am. Jour. Physiol., 1898, ii, 203.
19. Elliott: Jour. Physiol., 1912, xliv, 409.

splanchnic nerves. So suprarenal glands are played on with splanchnic nerves in emotion and vasomotor reflex with almost as frequent call as the blood vessels themselves. For instance, stimulation of sensory nerves and psychic emotions, according to Cannon and de la Paz, produce measurable quantities of epinephrin in the blood.[17] In our own experiments we often found that traumatization of the visceral peritoneum produced epinephrinlike rises of blood pressure. From these experiments we can assume that stimulation of the afferent nerves of the viscera is analogous to pain stimulation elsewhere. Suprarenalectomized animals do not furnish identical rises of blood pressure on peritoneal trauma. The work of Elliott[20] has shown that sciatic stimulation produces not only an output of epinephrin, but actually reduces the epinephrin content of the glands. Seelig and Lyon[21] have demonstrated vasoconstriction to be present in traumatic peritoneal shock. This could be maintained only through the forced output of epinephrin. The output of epinephrin in peritoneal trauma is protective in function. Symptoms of shock fully develop only after the supply of epinephrin is greatly depleted. Moreover, animals deprived of suprarenals present a condition of mental apathy, reduced sensibility, vasomotor disturbance, weakness, pallor, subnormal temperature, rapid and thready pulse, and irregular respiration, exactly as they do in shock.

Aside from Wiesel's finding in status thymolymphaticus, literature is not very rich in reference to epinephrin exhaustion in shock. Parkinson[22] could not demonstrate chromaffin substance in the suprarenals in a case of postoperative shock. This has been corroborated by the work of Hornowski[23] and Bainbridge.[24]

In traumatic shock, the forced output of epinephrin seemed to me so marked that I undertook a study to determine the condition of the suprarenals in such cases. My findings lead me to consider epinephrin as a shock factor. I do not state that epinephrin loss is shock, but rather that epinephrin is necessary to overcome shock, and anything that depletes epinephrin favors the development of that condition.

In the light of the work of Elliott and Cannon, Seelig and Lyon, my own observations have led to the foregoing statements for the following reasons: In a long series of animals reduced to traumatic shock by usual methods, I found a great degree of epinephrin exhaustion to exist. In this series the final appearance of the animal was that of complete shock — mental apathy, evidenced by unconsciousness with no ether, muscular relaxation, pale mucous membrane and low blood pressure. The average blood pressure was 12, and the average epinephrin content 8 per cent. In a few instances the blood pressure remained at from 30 to 45 mm., suddenly fell to 0, and the epinephrin content in these cases was 11 per cent. The average time to produce complete traumatic shock was six hours. Bulldogs[25] protected by morphin, not reduced to shock after four hours' trauma (average blood pressure 45 mm.), had epinephrin content of 0.35 per cent. In animals in which the suprarenals had been removed, only 1.3 hours of traumatization were necessary to produce shock. These animals showed no spontaneous recovery of blood pressure such as we get in a normal animal. Further than this, animals whose epinephrin content had been reduced by sciatic stimulation, but in which shock had not become manifest, very rapidly went into shock after a few minutes of peritoneal trauma. Boinet[18] states that suprarenalectomized rats are more quickly exhausted on exertion than normal animals. All of these traumatic shock cases, when determinations were made, showed a concentration of blood and a loss of blood in organs examined. In one instance, the blood pressure fell to 15 mm. and epinephrin content remained 45 per cent. In this case, concentration of blood was the predominant factor. Shock supervenes more rapidly in traumatized parietal peritoneum than on bowel trauma. Symptoms of shock become extreme with great suprarenal depletion. Epinephrinlike rises of blood pressure were usually absent in advanced shock. These are the cardinal reasons for considering epinephrin exhaustion as a shock factor, and using the same to express degree of shock.

Crile has demonstrated changes in the Purkinje cells of the cerebellum in shock. Without attempting to discuss the altered Nissl substance of those cells in shock,

AVERAGE EPINEPHRIN CONTENT

Procedure	Per. Cent.
Immediate chloroform poisoning	76
Chloroform anesthesia for 1 hour	35
Chloroform anesthesia for 4 hours	28
Ether deaths, primary anesthesia (not poisoning) frightened animals	6
Ether anesthesia, 1 hour	33
Ether anesthesia, 4 hours	24
Ether and morphin anesthesia, ¾ hour	60
Ether and morphin anesthesia, 4 hours	40
Ether anesthesia and operative trauma, 4 hours	21
Ether and morphin and operative trauma, 4 hours	34
Ether and morphin, quinin and urea block, operative trauma, 4 hours	35
Nitrous oxid-morphin-atropin anesthesia, 4 hours	65
Nitrous oxid, 4 hours	40
Local anesthesia, without preliminary morphin	27
Local anesthesia with preliminary morphin	70
Typhoid	3
Infection	3
Intestinal obstruction	7
Severe peritoneal trauma, ether anesthesia, 6 hours	9
Severe peritoneal trauma, ether and morphin, 4 hours	25
Severe peritoneal trauma, ether death, vagus inhibition	25

it seems to me that the truth of the following statement is apparent: If the epinephrin deficiency in the condition which we call shock is due to failure of the reflex mechanism in the brain by which epinephrin outflow is governed, then we should have a residual epinephrin in terminal shock in the suprarenal and not an almost complete exhaustion. Very little is known of the secretion[26] of epinephrin, but from the fact that the suprarenal ordinarily contains enormous loads to tide the individual through emergencies, it would seem that the storage-discharge factor were paramount over the secretory rôles. Further than this, the amounts of epinephrin needed to maintain vasoconstriction that exists in shock are evidence of the necessity for continued output of that secretion as long as an available supply exists.

The lipoid content of the suprarenal cortex is apparently unaffected in experimental traumatic shock.

The exhaustion of the suprarenal medulla through ether and other anesthetics explains the contributory part played by these agencies in shock, as is typified in the accompanying table.

The average epinephrin content of the normal suprarenal gland is taken as 100 per cent. The table gives

20. Elliott, T. R.: Jour. Physiol., 1912, xliv, 374.
21. Seelig and Lyon: Surg., Gynec. and Obst., 1910, xi, 146.
22. Parkinson: Tr. Path. Soc. London, 1907, p. 194.
23. Hornowski: Virchow's Arch. f. path. Anat., 1909, cxcviii, 33.
24. Bainbridge and Parkinson: Lancet, London, 1907, i, 1296.
25. Animals in this series were powerful male bulldogs, and figures are probably out of focus with the rest.
26. Biedl: Arch. f. d. ges. Physiol., 1897, lxvii, 456.

the average epinephrin content expressed as percentages resulting from the respective procedures.

CONCLUSIONS

Shock is a composite, in which epinephrin exhaustion and oligemia are predominant factors. Anesthesia, pain, fright and trauma are immediate agents in producing epinephrin exhaustion as well as shock.

ABSTRACT OF DISCUSSION

DR. J. E. MOORE, Minneapolis: About forty years ago we saw a great deal of what we called shock. I realize that many of these cases were acute anemia. Our methods of hemostasis were not so good as they are now. Now we can with impunity secure bleeding points and take all sorts of tissue along with them, with catgut ligatures. In those days we had a great deal of sepsis. Why do we see little shock today? We rarely see shock in the operating room. I realize that before eliminating these cases of hemorrhage we still had a much larger percentage of shock than today. The question arises, why? Dr. Corbett claims it is because of exhaustion of epinephrin in these cases. He says epinephrin is exhausted by sepsis. There is very little sepsis today and therefore we have removed one cause of shock. We have learned to use anesthetics more carefully and less of them, and therefore we have removed another cause of reduction of epinephrin. We are careful in the handling of our patients and the general public is not afraid of an operation today, and therefore the element of fear is taken away. And so on down the line we make the practical application of Dr. Corbett's paper. Infection, fright, too much anesthetics, etc., that lower the production of epinephrin should be eliminated. I am glad he states that epinephrin is not the whole thing. I am glad he looks on shock as a symptom complex. We all agree with him in that. The question I want to ask is, that if these symptoms of shock are due to the loss of epinephrin, why can't we relieve these symptoms by the administration of epinephrin?

DR. J. F. CORBETT, Minneapolis: The purpose of this paper was to show that shock developed rapidly in the absence of residual epinephrin, and by what means the epinephrin content of the suprarenal gland became exhausted. The reason for doing this was to point out methods for conserving this epinephrin content. I do not think that epinephrin administered artificially is the antidote for shock, because the amounts of epinephrin normally in the blood are exceedingly small, and if we try to maintain blood pressure by forcing epinephrin we have to use continued larger doses to maintain our results. The continuous administration of increasing doses of epinephrin has a deleterious effect on the blood vessels and might increase the concentration of the blood, adding this factor to shock.

Practice of Medicine in Colombia.—U. S. Consul Isaac A. Manning at Barranquilla, Colombia, gives in *Daily Consular Reports* the requirements for foreigners practicing medicine in Colombia, according to the law of 1914. An individual having a diploma issued by a foreign faculty must present to the government of the department in which he wishes to practice his diploma properly certified by a Colombian diplomatic or consular officer resident in the country of issue, must prove his identity by a photograph attached to the diploma, stamped with the seal of the legation or consulate where legalized, and must pass an examination of an hour in clinics in a hospital and before a council of four examiners named by the board of hygiene, or by the medical faculties, where such exist. There are some other provisions of the law for those who have practiced in the country previous to the passage of the law referred to. Natives graduating at approved medical schools abroad on proper certification of their diplomas may practice without examination under the same conditions as the graduates of Colombian medical schools.

PHENOLTETRACHLORPHTHALEIN TEST OF LIVER FUNCTION

IN A SERIES OF UNSELECTED CASES*

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In an endeavor to devise a reliable and convenient test of liver function, Rowntree, Hurwitz and Bloomfield[1] have suggested the use of the dye phenoltetrachlorphthalein, and have perfected a method for its administration and subsequent estimation in the feces. They report studies of this test in sixty-seven patients, thirty-seven of whom, including those with myocardial insufficiency, were classified as having pathologic livers. They state that the number of cases thus far observed is too small to warrant far-reaching deductions, but conclude that their studies "indicate that the excretion of tetrachlorphthalein will be useful in the estimation of the functional capacity of the liver."

Chesney, Marshall and Rowntree[2] studied this and other tests in forty-five cases. They express the opinion that the determination of phenoltetrachlorphthalein excretion is of decided value in revealing the presence of, and to a less degree the extent of, functional liver involvement.

Sisson[3] studied phenoltetrachlorphthalein excretion in forty-one cases and reached no definite conclusion regarding its value as an index of liver function.

Whipple[4] and his co-workers have made thorough and elaborate observations on the excretion of this dye under experimental conditions. Dogs were subjected to this test after liver injuries of various nature and extent. These authors show that in normal dogs the excretion is quite constant, and with definite liver injury is proportionately diminished. They state that simple circulatory changes will occasion diminished output and call attention to the fact that lowered functional capacity of the liver without demonstrable histologic change may cause decreased phthalein output.

In undertaking these studies of phenoltetrachlorphthalein excretion, it was our expectation for purposes of comparison, to carry out one or more other tests of similar intent, but in reviewing the voluminous literature of other functional liver tests, we were forced to the conclusion that none of these were suitable for this purpose.

The carbohydrate tests in their present form give untrustworthy results, and the fibrinogen, lipase and nitrogen partition estimations from a clinical standpoint seem to be of doubtful value.

Urobilin estimation as a means of determining liver efficiency would seem most rational. It certainly has much in its favor, yet there are serious difficulties in the way of its practical use. Wilbur and Addis[5] point to the wide daily variations in the output of this sub-

* Read before the Section on Practice of Medicine at the Sixty-Sixth Annual Session of the American Medical Association, San Francisco, June, 1915.

1. Rowntree, Hurwitz, and Bloomfield: Bull. Johns Hopkins Hosp., 1913, 327.

2. Chesney, A. M.; Marshall, E. K., and Rowntree, L. G.: Studies in Liver Function, THE JOURNAL A. M. A., Oct. 31, 1914, p. 1533.

3. Sisson, Warren R., A Clinical Study of Two Hepatic Functional Tests, Arch. Int. Med., December, 1914, p. 804.

4. Whipple, Mason and Peightal: Bull. Johns Hopkins Hosp., 1913, xxiv, 207; Whipple, Peightal and Clark: Bull. Johns Hopkins Hosp., 1913, xxiv, 207; Whipple and Speed: Jour. Exper. Med., 1915, xxi, 193; Whipple: Jour. Exper. Med., 1914, xx, 297.

5. Wilbur, R. L., and Addis, Thomas: Urobilin: Its Clinical Significance, Arch. Int. Med., February, 1914, p. 235.

stance and state that to get an accurate measurement, estimations in each individual case should cover a period of two weeks — a circumstance which greatly reduces the clinical availability of urobilin estimations.

Since there is at hand no accurate yardstick, so to speak, by which we can measure the phenoltetrachlorphthalein test, it seemed to us less confusing to carry out this test alone and to compare its results with our clinical data and when possible with necropsy findings.

The method followed was that originally suggested by its authors.[1] The minor changes in dosage and technic recently suggested by Whipple,[4] do not alter the principle of the test nor its clinical value, and we thought it best to adhere to the original directions.

Briefly, the test is as follows: An accurately measured quantity of a freshly prepared solution of phenoltetrachlorphthalein, greatly diluted, is given intravenously; 30 to 45 per cent. of this dye is normally excreted by the liver and can be recovered in the feces. For this purpose the feces are collected for forty-eight hours. After the proper diluting, shaking and clarifying of the collected feces the phthalein of the resulting solution is estimated in a colorimeter and the output thus computed. The authors of this test believe that an output of less than 30 per cent. indicates liver disease, organic or functional.

Because of the well-known difficulties in obtaining forty-eight hour feces of a large number of patients, great pains were taken to insure the accuracy of our collections. The nature of the work was explained to the interns, nurses and orderlies, and as a reminder, a large red placard was hung on the bed of each patient whose feces were being collected.

To each patient it was explained that we were endeavoring to estimate the ability of his liver to do its work — an explanation which invariably appeals to the patient and gains his cooperation. In certain cases of exceptional interest a special nurse was provided whose sole duty it was to care for the patient and collect the feces.

We believe we have detected the few mistakes which, despite these precautions, did occur, and we have excluded these cases.

A water-driven machine was used for shaking the feces which were worked up always by the same individual (F). Colorimetric readings in most instances were made by both of us.

TABLE 1.—GROUP I, DISEASE CONDITIONS OF LIVER

Case No.	Name	Age	Diagnosis	Phenoltetrachlorphthalein Percentage in Feces	Phenoltetrachlorphthalein Percentage in Urine	Remarks
1	J. P.	47	Cirrhosis	40	0	
2	B. F. N.	41	Cirrhosis	45	0	
				34	Lost	Six days later
				18	.....	Twenty days later
				27	11	Twenty-five days later
3	W. H.	40	Cirrhosis	25		
				42	.....	Twenty-one days before death
4	C. E. E.	60	Cirrhosis	25-30	0	Wassermann positive
5	W. B.	34	Cirrhosis	30-35	0	Wassermann positive
6	R. Y.	30	Abscess	26	1	Three days after operation
7	C. H. T.	28	Abscess	35-40	1	Wassermann positive
8	J. L.	26	Sarcoma	35	0	Extensive involvement
9	G. T.	6	Syphilitic(?) hepatitis	40	0	
10	M. P.	45	Partial biliary obstruction, adhesions	52	0	Jaundice for 33 years
				38		
11	J. C. M.	45	Biliary obstruction, tumor	0	15	Cancer of liver

We wish to report our studies of 100 cases. Eleven of these represent primary liver disease and form Group I. Seventeen cases of myocardial insufficiency with consequent circulatory changes in the liver make Group II. In Group III we have placed the miscellaneous cases representing various disease processes. Each case here reported has been carefully studied for clinical evidence of liver disease. All of Group III, including the six alcoholics, were negative in this regard.

TABLE 2.—GROUP II, MYOCARDIAL INSUFFICIENCY

Number	Name	Age	Extent of Decompensation	Liver Enlargement	Edema	Per Cent. in Feces	Remarks
12	A. McN.	44	Extreme	++	+	29	Marked arteriosclerosis
13	Mrs. H.	35	Slight	0	0	39	Wassermann positive
14	Mrs. H.	50	Slight	0	0	45	Wassermann positive
15	L. D. J.	31	Extreme	+++	++	23	Slight jaundice
16	J. K. H.	75	Slight	+	+	30	Wassermann positive
17	M. P.	30	Moderate	0	+	48	
18	J. L.	59	Moderate	0	+	42	Wassermann positive, chronic alcoholism
19	W. J.	24	Extreme	+	++	20	Died 12/8. Liver congested, weight 1,680 gm.
20	T. L.	24	Moderate	+	+	42	
21	A. J.	34	Extreme	++	++	65	Died 3/18
22	W. T.	56	Extreme	+++	+	10	
			One week later	+	0	10	Improvement
23	W. J.	54	Moderate	0	+	10	
			Eight days later	.....	.....	25	
24	D. L.	24	Extreme	+	+	29	Died 4/11. Marked anemia
25	G. A.	45	Moderate	+	+	40	Albumin and casts in urine
26	B. C.	31	Extreme	+	++	64	
27	L. M.	21	Slight	0	+	23	
28	R. P.	34	Moderate	++	+	48	Syphilis, malaria

We wish to escape the criticism so often offered, of giving insufficient clinical data; yet it is manifestly impossible to publish protocols of the entire series, and we content ourselves with appending notes containing all pertinent data regarding the liver cases in Group I.

REPORT OF CASES

Case 1.—J. P., aged 47, a colored laborer and chronic alcoholic, with diagnosis of cirrhosis of the liver, had typhoid fever twelve years ago and malaria one year ago. The patient is obstinately constipated. For several months there has been a gradual enlargement of the abdomen. One week before his admission his abdomen was tapped, four liters of fluid being removed. When admitted he had considerable fluid in the abdomen; the abdominal organs could not be palpated. The liver on percussion seemed smaller than normal; the heart was negative; there was no edema and no jaundice. Leukocytes, 10,000. The urine and Wassermann were negative. When the abdomen was tapped, three liters of straw colored fluid were withdrawn. The phenoltetrachlorphthalein output in the feces was 40 per cent.; in the urine, none.

Case 2.—B. F. N., aged 41, a white carpenter, with diagnosis of cirrhosis of the liver, had tertian malaria in 1905, and smallpox in 1906; for twenty years he had been a steady and excessive user of alcohol and tobacco. For several months, a loss of weight and constant enlargement of abdomen had been noted. He became too weak to work, and very much emaciated. A moderate edema of lower extremities and scrotum existed. The abdomen was greatly distended, the superficial abdominal veins being dilated and tortuous. The peripheral arteries were soft, the heart and lungs negative. Systolic pressure was 115, diastolic 90. The temperature was normal. There was no jaundice and the Wassermann was negative. The urine showed a small quantity of albumin and a few hyaline casts. The abdomen, tapped March 7, yielded 8 liters; April 3, 7½ liters; April 12, 16 liters; April

17, 6 liters; April 27, 15 liters; May 5, 12 liters; May 14, 12 liters; May 21, 13 liters.

The edema of the feet and scrotum disappeared after the first tapping. The phenoltetrachlorphthalein output in the feces February 26 was 45 per cent.; March 2, 34 per cent.; March 22, 18 per cent.; April 17, 27 per cent.; with the urine 11 per cent.

CASE 3.—W. H., aged 40, a colored coal miner, with diagnosis of cirrhosis of liver, had had his abdomen tapped several times within the past two years. He was accustomed to the constant, though not excessive, use of alcohol. When admitted his abdomen was greatly distended with fluid. The edge of the liver could not be felt. The heart and lungs were negative. A week later the sclera were slightly tinged. This subsequently disappeared. The Wassermann was negative. The urine showed albumin and casts. The abdomen, tapped March 6, yielded 12 liters; March 18, 15 liters; March 25, 5 liters; April 2, 16 liters. The phenoltetrachlorphthalein output in the feces March 9, was 25 per cent.; in the urine none; March 24, 42 per cent.; in the urine, none. The patient died April 13.

TABLE 3.—GROUP III, MISCELLANEOUS CASES

No.	Name	Age	Diagnosis	Per Cent. of Output
29	E. B. H.	52	Acute and chronic alcoholism	34
30	D. D. L.	50	Acute and chronic alcoholism	40
31	M. B.	54	Acute and chronic alcoholism	51
32	F. C.	33	Acute and chronic alcoholism, syphilis	25
33	M. C.	45	Alcoholic dementia	30
34	M. Z.	28	Alcoholic gastritis	52
35	K. McC.	52	Chronic morphinism	0, 10
36	M. W.	56	Chronic morphinism	20, 20-30
37	M. R.	40	Tuberculosis of the hip	23
38	E. W.	38	Tumor of mediastinum (syphilis)?	45
39	N. H.	19	Venereal ulcer	28
40	G. L.	33	Secondary syphilis	23
41	W. E. D.	42	Syphilis, arteriosclerosis, hemiplegia	14, 20
42	S. O.	27	Endarteritis obliterans, hemiplegia, syphilis	30
43	F. G. W.	62	Arteriosclerosis, cardiac hypertrophy	14
44	D. G.	42	Aortic aneurysm	30
45	S. W. F.	24	Chronic parenchymatous nephritis	39, 40-50
46	M. B.	25	Pulmonary tuberculosis, syphilis	41
47	M. C.	30	Pulmonary tuberculosis (early)	18
48	G. C.	14	Pulmonary tuberculosis (early)	40
49	F. T. W.	62	Pulmonary tuberculosis	14
50	W. M.	56	Arteriosclerosis	40
51	W. B.	68	Pulmonary tuberculosis, arteriosclerosis, senility	10, 21
52	R. D.	48	Pulmonary tuberculosis, dilated aorta	45
53	L. P.	36	Gonorrheal arthritis	37
54	F. M.	35	Gonorrheal arthritis	35
55	T. B.	25	Gonorrheal arthritis	32
56	J. L. I.	24	Gonorrheal arthritis	15-20
57	C. H. T.	29	Rheumatic fever	30
58	H. A.	48	Rheumatic fever	10
59	I. L. R.	28	Rheumatic fever	25
60	R. B.	23	Rheumatic fever, acute endocarditis	32
61	M. H.	47	Multiple arthritis, pyorrhea alveolaris	40
62	J. K.	40	Influenza	15
63	M. J.	33	Influenza	22
64	J. Y.	23	Bronchitis	40
65	I. McC.	50	Bronchitis	30
66	M. H.	45	Tonsillitis	14
67	E. B.	47	Pernicious anemia	35-40, 50-55
68	M. C.	50	Pernicious anemia (?)	35
69	G. W.	41	Tuberculosis, peritonitis	22
70	H. S.	36	Tuberculosis of hip	45
71	L. W.	58	Catarrhal pneumonia	30
72	J. M.	51	Catarrhal pneumonia, syphilis	50
73	J. E.	23	Convalescent pneumonia	45
74	S. B. W.	51	Convalescent pneumonia	23
75	F. A. M.	35	Convalescent pneumonia	37
76	D. M. C.	18	Convalescent pneumonia	35
77	A. H.	47	Convalescent pneumonia	21, 45
78	P. T.	23	Lobar pneumonia	35
79	C. R.	36	Convalescent pneumonia	42
80	M. D.	37	Acute otitis media	34
81	S. L.	46	Traumatic epilepsy	35
82	C. N.	17	Traumatic epilepsy	40
83	R. E. S.	54	Hypertrophy of prostate	40
84	M. W.	42	Diabetes mellitus	40
85	R. P. B.	30	Gastric ulcer	53
86	E. N.	33	Cholecystitis, perigastritis	45-50
87	M. F. F.	59	Urethral fistula	60-65
88	J. P.	50	Sarcoma of jaw	13
89	L. P.	57	Ovarian cyst	10
90	L. N.	50	Fibroid tumor of uterus	46
91	A. S.	25	Uterine fibroid tumor	12-15
92	M. McB.	25	Atonic constipation	37
93	T. W.	23	Varicose ulcer of leg	45
94	F. D. B.	47	Burns on legs	37
95	J. F. L.	56	Epithelioma of face	32
96	S. M.	19	Sacro-iliac strain	34
97	D. McD.	17	Fracture of femur	20
98	A. L.	23	Asthma, unknown cause	35
99	J. S.	40	Neurasthenia (?)	29
100	M. E. P.	30	Neurasthenia (?)	30

At necropsy the lungs showed a marked anthracosis and numerous pleural adhesions. The heart walls and valves were normal. There was no sclerosis of the aorta. The heart weighed 260 gm. The abdomen contained about 4 liters of fluid. There were numerous recent adhesions between the omentum, stomach, and colon. A thick peritoneal exudate was noted, but no tubercles. The liver was small, covered with fibrous adhesions, cut hard, and the cut surface was pale and granular. It measured 14 by 17 by 8 c.c. and weighed 865 gm. The spleen was enlarged, cut hard, and weighed 275 gm. The kidneys weighed 135 and 138 gm., respectively and showed a moderate degree of sclerosis.

Sections show advanced sclerotic changes, the portal canals are thickened and prominent and the normal lobular markings are greatly disturbed. Connective tissue trabeculae extend into the lobules and break them up into larger and smaller islands which usually show little trace of the normal architecture. The connective tissue of the portal canals and of the capsule is infiltrated by numerous lymphocytes and plasma cells. There is an occasional suggestion of hyaline masses within the liver cells such as are described by Mallory in alcoholic cirrhosis, but the poor preservation of the tissue will not allow of a positive statement in this particular. In other respects, however, the picture is typical of an alcoholic lesion. Diagnosis: (Late) alcoholic cirrhosis.

CASE 4.—C. E., aged 60, white, a lawyer, had a diagnosis of cirrhosis of the liver, arteriosclerosis, chronic interstitial nephritis and syphilis. His mother died of chronic nephritis. He had pneumonia at 17 years of age and syphilis fifteen years ago. He had had salvarsan treatment with mercury, the last treatment six months ago. Twelve years ago albumin was found in the urine and a beginning interstitial nephritis was suspected. The heart was normal at that time. For the past few months he has suffered from bulimia, loss of weight, pains and discomfort in epigastrium, and diarrhea. Three months ago abdominal distention was noted; edema of the feet appeared one month ago. The urine has been scanty for some time. Physical examination showed great emaciation. The lungs were negative; the heart apex was in the sixth interspace 1 inch outside the nipple line; its impulse transmitted shock to the entire left chest; a rough systolic murmur was heard everywhere, best at base. The abdomen was greatly distended, the superficial abdominal veins being very prominent. Neither spleen nor liver was palpable. The deep and superficial reflexes were normal. Systolic pressure was 160, diastolic 135. The peripheral arteries were hard and tortuous. The urine showed a large amount of albumin and many casts. The Wassermann was strongly positive. On May 7, 6½ liters of straw colored fluid was removed from the abdomen. May 15, 5 liters were removed. The phenoltetrachlorphthalein output in the feces was 25 to 30 per cent.; in the urine, none.

CASE 5.—W. B., aged 34, a colored laborer, with a diagnosis of cirrhosis of liver and syphilis, had malaria at the age of 12. For the past eight or nine years he has suffered indefinite pains in the abdomen and right lumbar region. For the past year he has had abdominal discomfort after eating and is obstinately constipated. He has lost 15 or 20 pounds. One month ago abdominal enlargement was noted. Two weeks ago hemorrhoids appeared. The temperature was normal. He was emaciated. The heart and lungs were negative. Systolic pressure was 125, diastolic 85. The abdomen was moderately distended with fluid. The edge of the liver was not felt and on percussion this organ appeared smaller than normal. The spleen was easily palpated. There was no edema. The urine showed little albumin and no casts. The Wassermann was strongly positive. The phenoltetrachlorphthalein output in the feces was 30 to 35 per cent.; in the urine, none.

CASE 6.—R. Y., aged 30, a colored laborer, with diagnosis of abscess of the liver, gave an indefinite history of dysentery several years ago. He was a well-nourished man. A smooth mass sensitive to pressure extended 4 fingers' breadth below the right costal margin. The right lower chest posteriorly

was very sensitive to percussion, and was more prominent than the left. The temperature was 100 to 101. Leukocytes 24,000. The urine was negative. At operation a large quantity of pus (said to be about 8 ounces) drained from the right lobe of the liver. The patient had a slow and uneventful recovery. The amount of phenoltetrachlorphthalein in feces after operation was 26 per cent.; in urine, 1 per cent.

CASE 7.—C. H. T., aged 28, a white convict guard, had a diagnosis of abscess of the liver and incipient pulmonary tuberculosis. His mother died of tuberculosis. He had pneumonia at the age of 10. Three years ago a small abscess was found in the lower right lobe of the liver and was drained. No amebas were found. One year later, the patient had an illness characterized by epigastric pain and fever. The symptoms subsided after three or four weeks in bed. He now complains of pain in the epigastrium. The temperature was irregular. Leukocytes, 17,000. The urine was negative. A smooth rounded mass, the size of a small orange, apparently part of left lobe of liver, could be felt just below the ensiform cartilage. Pressure produces intense pain at this point, but is negative elsewhere. There is no extension upward of the liver dulness. Fluoroscopic examination disclosed: "Excursion of diaphragm good. No area of rarefication or excessive density. Liver enlarged." The physical examination disclosed a few râles at the apex of one lung. The phenoltetrachlorphthalein recovered in the feces was 35 to 40 per cent.; in the urine, none. The liver was subsequently incised and 1 ounce of pus evacuated.

CASE 8.—J. L., aged 26, a colored house servant, with a diagnosis of multiple melanotic sarcomas involving the liver, was admitted because of a growing pigmented mole on her forehead. The mole increased rapidly in size and numerous growths of similar nature appeared in various parts of the body. The liver became enlarged. The temperature was irregular. The Wassermann was positive. She was given intravenously, numerous doses of mercury succinimid without benefit. Two weeks before death a nodular abdominal mass, apparently of the liver, was noted, extending 2 inches below the umbilicus in the midline. The phenoltetrachlorphthalein output in the feces was 35 per cent.; in the urine, none (ten days before death). The patient died February 5.

Necropsy: A large pigmented tumor involved the entire right frontal and parietal regions of the scalp. The lymph nodes were extensively enlarged. Numerous pigmented moles slightly elevated and rough, were scattered over the skin of the entire body. The abdomen contained a large quantity of dark fluid, and an enormously enlarged liver reaching about half way to the symphisis pubis. The entire surface of the liver was covered with pigmented nodules measuring from 2 mm. to 4 c.c. These dark brown nodules almost entirely replaced the liver parenchyma—only occasionally on the cut surface could be seen apparently normal parenchyma running as trabeculae between the pigmented tumors. The liver weighed 4,800 gm.

The following microscopic report was made by Dr. G. S. Graham:

The liver is studded with larger and smaller nodular tumor masses made up of rounded to elongated cells heavily laden with granules of brown pigment. The nucleus is often completely obscured. The larger nodules sometimes show necrotic changes which in places have been followed by partial fibrosis. At the periphery of the nodules the tumor cells invade the sinusoids, cell cords and the connective tissue of the portal canals, completely replacing the normal structures. There are many microscopic collections of pigmented cells within the lobules and in the tissue of the portal canals. In the latter location the blood vessels are sometimes crowded with tumor cells. The sinusoids everywhere contain pigmented cells that occur singly or in small groups. Some of these are undoubtedly endothelial cells. The liver cells in the zone about the tumor nodules are often congested and atrophic. Only rare mitosis can be found in the tumor cells. Diagnosis: Melanotic sarcoma. Apparently a slow-growing metastatic tumor laid down in the liver as numberless microscopic and mascroscopic nodules.

CASE 9.—G. T., aged 6, colored, had a diagnosis of syphilitic (?) hepatitis and pertussis. The family history was negative except that the mother had one miscarriage at six months. The patient was a normal baby, having had no former illnesses except mumps. Ten months before admission a gradual swelling of the abdomen and loss of weight, with night sweats and cough were noted. When admitted the patient showed moderate emaciation, general slight enlargement of lymph nodes, mild general bronchitis, and distended abdomen, the liver extending to within 1½ inches of the umbilicus. There was a bony enlargement on the humerus. The patient also had whooping cough of recent acquisition, with temperature range from 97 to 100. The Wassermann in the blood and spinal fluid was negative; the von Pirquet positive. The blood and urine negative. Mercury and potassium iodid were administered with marked improvement in general condition and reduction in size of liver, and the patient was discharged greatly improved. Three days previously phenoltetrachlorphthalein was given (one quarter the adult dose). The output in the feces was 40 per cent. of that given; in the urine, none.

CASE 10.—H. P., aged 43, white, an inmate of the Alabama Hospital for the Insane, was given the diagnosis of biliary obstruction. There was nothing suggestive in his family history. Until ten years of age he was apparently well. At that time he had an acute febrile attack with marked abdominal tenderness, became jaundiced and has remained so (thirty-three years).

At operation numerous adhesions in the region of the gallbladder were found, but no stones. The gallbladder was drained and ten days later it was reported that the patient's skin had cleared up markedly. Two tests, one week apart and both prior to operation, were done. The phenoltetrachlorphthalein output in the feces was 52 and 38 per cent., respectively; in the urine, none. Drainage of the wound prevented a repetition of the test. (Kindness of Dr. L. W. Grove.)

CASE 11.—J. C. McL., aged 45, a colored laborer, with the diagnosis of carcinoma of the liver and gallbladder and biliary obstruction, had had loss of weight and "weak feeling" for the past six months. Three weeks previous to admission he first experienced pain in the epigastrium appearing immediately after eating and lasting two or three hours. The pain persisted. When admitted the patient was a fairly well-nourished man, deeply jaundiced. The lungs and heart were negative; the abdomen was rigid and difficult to palpate. The liver was nodular, slightly enlarged, with a mass indistinctly felt in the right hypochondrium. The stomach contents showed achlorhydria. The Wassermann was negative. Leukocytes 9,500. At operation a tumor, evidently cancer, was found involving the liver and gallbladder.

The patient died a few days after the operation. A necropsy was refused, but the abdominal incision was opened and the common bile duct was found to be completely occluded by this tumor. A specimen of tissue removed proved to be carcinoma. Phenoltetrachlorphthalein was given a few days prior to the operation. The output in the feces was none; in the urine, 15 per cent.

SUMMARY

In Group I are five cases of cirrhosis — four advanced and typical; one (Case 5) is less advanced and is perhaps open to question. Each of the five gave a normal phenoltetrachlorphthalein output at some time during the patient's stay in the hospital. One of them (Case 3) showed a slightly diminished output at first; but again twenty-one days before the patient's death, with a liver weighing one half the normal, the phenoltetrachlorphthalein output was well within normal limits.

Another patient (Case 2), on entering the hospital three months ago, in grave distress, gave an output which reached the upper limits of normal. His second test showed a low output, but a third gave an almost normal percentage — this, when the man appears to have at best only a few weeks of life ahead.

The average output of the five cirrhosis cases was normal.

A case of multiple sarcoma of the liver gave a normal output. At necropsy almost no true liver parenchyma could be found.

The absence of phenoltetrachlorphthalein in the feces in Case 11 was evidently due to complete occlusion of the common bile duct.

Group II presents some rather bizarre results. Certain of the cases showing marked liver engorgement and low phenoltetrachlorphthalein output would encourage one to believe that here we have a means of measuring liver injury. On the other hand, some of the most extreme cases in this group gave a normal amount of phenoltetrachlorphthalein in the feces. Taking this group as a whole, we cannot read in it any close relationship between liver engorgement and phenoltetrachlorphthalein output.

In Group III are seen wide variations in phthalein output for which we can offer no explanation.

CONCLUSION

In the consideration of our cases and in view of the inconclusive results reached by the authors quoted, one naturally asks: Does the output of phenoltetrachlorphthalein necessarily depend on the functional capacity of the organ which excretes it?

Since such a large part of the phenoltetrachlorphthalein introduced is oxidized or otherwise destroyed in the body, is it not possible that this unknown destructive process is itself the variable factor and that on it depends the amount of phenoltetrachlorphthalein which reaches the liver for excretion?

We conclude that the phenoltetrachlorphthalein test of liver function taken alone in its present form is of no clinical value.

ABSTRACT OF DISCUSSION

DR. GEORGE H. WHIPPLE, San Francisco: I know but little about the clinical application of this test. However, I would like to speak to you of its application to animals with disease experimentally produced, in which the studies can be better controlled than in clinical cases. If the functional activity of the liver is altered by changes in the blood supply, this test shows it. If the liver is injured, as by the introduction of poisons, this test shows it. If the liver is stimulated by small doses of poison, this test gives evidence of hypersecretion. If the functional activity of the liver is impaired by exsecting certain ductless glands, this test shows that the action of the liver has been affected. So from the physiologic standpoint, it has been shown that this test is of very great value in that it gives an index as to the functional activity of the liver cells.

Functional activity and anatomic findings do not always harmonize. We are not justified in expecting that this test will diagnose scars in the liver. But to determine whether or not the liver cells are functionating properly can be done only by a functional test. We may not have at the present time sufficient knowledge to interpret this test. Workers in Baltimore, who were carrying on clinical work at the time we were carrying on the physiologic experimental work with this test, found that it is of some value. Animal experimentation has shown that it is apparently of value. In clinical work, it would seem better to make a careful comparison of several of these tests, and we would then probably find that the readings would be instructive, particularly when compared with the necropsy findings. If phthalein escapes with the urine, it means that there is an obstruction to the escape of the phthalein or injury of the liver cells. That is at least something indicated by the test. The fact that the speaker found that it appeared in the urine in association with liver abscess, is instructive. Then, too, there are other tests of value both experimentally and clinically. First we might mention the estimation of fibrinogen in the blood, which apparently is maintained at a normal level by the liver, and only when the liver is in bad straights does it fail to keep the fibrinogen at a proper level. When it falls, this indicates very poor liver function. The observation of a fibrolytic ferment is also of value. It would be well to try those two tests with the phenoltetrachlorphthalein test. I would protest against a hasty conclusion that this test is of no value. We should not too readily put aside the work on animals because of evidence collected from patients, where there may be many factors that we do not now understand and cannot control. Many factors must be carefully controlled, especially that of purgation. It would be safer to say that we must be careful in drawing conclusions regarding the meaning of the tetrachlorphthalein test.

DR. T. ADDIS, San Francisco: Dr. McLester stated in connection with the urobilinogen and urobilin test of liver efficiency that he understood from the work of Wilbur and Addis that daily estimations of the total excretion in the urine and stools over a period of two weeks were required before any decision could be made as to the presence or absence of hepatic insufficiency. This is not what these authors intended to convey. On the contrary, the demonstration of large amounts of urobilinogen and urobilin even in one specimen of urine is valuable evidence of defective liver action in those patients in whom there is no clinical evidence of increased rapidity of blood destruction. It is true that it is not conclusive evidence, because increased blood destruction may occur without obvious signs other than that obtained from a determination of the amount of urobilinogen and urobilin excretion in the stools. Daily observations for at least a week are required definitely to determine that point. In purely clinical work this is not always possible. Yet this does not make the test useless. After all, it is doubtful whether any of our clinical functional tests can be regarded as in themselves decisive. In this particular instance, we maintain that the estimation of urobilinogen and urobilin in the urine—an extremely simple procedure which need not take more than ten minutes—may give very strong evidence of the presence of a generalized disorganization of liver function.

DR. JAMES S. MCLESTER, Birmingham, Ala.: Dr. Whipple's work with animals would lead one to rely on this test; yet clinical investigations thus far reported, together with our own work, point, to my mind at least, in the opposite direction. This can be explained by the fact that the results of animal experimentation cannot always be unreservedly applied to clinical medicine. Regarding our failure to compare this with other tests of liver function, we felt that to measure this test by others, themselves of doubtful value, would result merely in confusion.

Limiting Emporiums for Liquor Selling.—The province of Quebec has recently put into operation a plan for reducing the number of places in which liquor is sold. It provides, for instance, that the number of such places in the city of Quebec shall be limited to fifty after May 1, 1915, and accordingly on that date forty-seven licenses were abolished and the owners of the places run under them were each paid $3,000 in the way of indemnity. The amount of the indemnity paid is to be recouped by increasing the license fee of the other dealers, and inasmuch as their trade will presumably be increased to some extent, they can probably well afford to pay the additional fee. In Montreal, where there have been 470 such places, the number is to be reduced gradually, a certain number being abolished each year. The amount of indemnity is to be greatest the first year and will decrease in amount each year, and the license fee of the remaining places will be increased each year. It is probable that limiting the number of places and the ease with which liquor can be procured will have a material effect in decreasing consumption, and as a step toward practical prohibition has much to commend it.

THE MOTOR FUNCTIONS OF THE INTESTINE FROM A NEW POINT OF VIEW*

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According to modern textbooks the small bowel is a tube whose structure and physiologic characteristics are much the same from one end to the other; and material is supposed to move aborally because of the myenteric reflex, or Bayliss and Starling's "law of the intestine." According to this law,[1] "Excitation at any point of the gut excites contraction above and inhibition below"; and it can easily be seen how this mechanism must favor the aboral progress of material through the intestine.

Cannon[2] has warned us, however, that this reflex and normal peristalsis are not the same, nor is it always in control of the mechanism of the bowel. A moment's thought will show that this must be true; otherwise food once introduced into the duodenum would never stop in its rush to the anus. My own graphic records of peristaltic rushes, secured with six or seven enterographs, rarely show any relaxation before the oncoming wave. On the contrary, powerful contractions appear below, which serve to stop the rush from going too far.

Unfortunately, the stimuli ordinarily used to elicit the reflex have been traumas — pinches, sudden distention by balloons, etc., and little effort has been made to see what happens above and below the normal loopful of digesting food.[3] Much might be said about the difficulties met with by those who have studied this reflex; about the narrow limits (2 to 3 cm. on either side of the stimulus) within which it ordinarily is operable, but it would be beside the point. The existence of the reflex has been well established; but we do not know how far it enters into normal peristalsis, and we must admit that this explanation for the downward progress of food through the intestine is not sufficient in itself. Perhaps for this reason the "law of the intestine" has been of little help to the gastro-enterologist in the solution of his problems. "It does not govern the rhythmic contractions of the small intestine, the rhythmic peristalsis and antiperistalsis of the colon, and probably not the rhythmic waves of the stomach. . . . For these activities *the tonic contraction of the wall of the canal is all-important.*"[4]

FUNCTIONAL DIFFERENCES IN THE VARIOUS PARTS OF THE INTESTINE

A number of writers[5] in the past have noticed differences in muscular strength and tone — differences in rhythm and irritability — in the various parts of the bowel; but they did not seem to realize the importance of their findings, and their writings certainly have had no effect on our conception of the motor functions of the intestine. My own study of these functional differences in the various parts of the intestine of animals soon suggested to me that they might play a large part in the passage of material through the tract. The contents of a muscular tube so constructed would probably move from the more active, irritable and powerful regions above to quieter, less sensitive segments below, where the muscular coats are thinner and less tonically contracted. Reverse peristalsis would hardly occur unless the lower parts of the bowel could be stimulated to an activity greater than that ordinarily found in the upper stretches.

We think of the heart today, not as pump with purely mechanical valves, but as an elaboration of the primitive tube in which the rhythmic power of each segment varies inversely as does the distance from the sinus.[6] So important is this difference that the current is reversed in the simpler types of heart if the aortic end be made to beat faster.[7]

Similar experiments have been performed with segments of the digestive tract. The direction of peristalsis in the crop of *aplysia*, a large marine snail, can be changed at will by increasing the tension at one end or the other.[8] Cannon[9] has shown that waves will course over the excised stomach of a frog or cat in either direction, depending on the location of a pulsating tonus ring. Still more pertinent is the experiment in which he dipped the aboral end of a short loop of small intestine into a weak solution of barium chlorid, and by thus raising its tone, reversed the direction of peristalsis.[10] Stimuli which raised the tone in the middle of such a loop sent off waves in both directions.[11]

The few references I have been able to find to the motor functions of the digestive tract in the lower forms of life show how much the progress of food through their simple tubes depends on local differences in tone and rhythmicity.[12] It is harder to recog-

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1. Bayliss and Starling: Jour. Physiol., 1899, xxiv, 110.
2. Cnnon: Am. Jour. Physiol., 1912, xxx, 125.
3. "What causes the myenteric reflex to appear or not, when material is present, is as yet undetermined," Cannon: Am. Jour. Physiol., 1912, xxx, 125.
4. Cannon: The Mechanical Factors of Digestion, London, 1911, p. 195.
5. For some of the literature, particularly in regard to differences in rhythm, see Alvarez: Am. Jour. Physiol., 1914, xxxv, 177; ibid., 1915, xxxvii, 266. Differences in muscular thickness in different parts of the small intestine have been noted by Monks: Ann. Surg., 1905, xlii, 549; Berard: Cours de physiologie, Paris, 1849, ii, 285; Jonnesco: Poirier et Charpy's Traité d'anat. humaine, Paris, 1901, iv, 284; Flint: Textbook of Human Physiology, New York, 1895, p. 234, and others. Differences in sensitiveness to various stimuli have been observed by Schillbach: Arch. f. path. Anat., etc., Berl., 1887, cix, 281; Biedermann: Arch. f. d. ges. Physiol., 1889, xlv, 372 and 379; Floel: Ibid., 1885, xxxv, 161; Lüderitz: Arch. f. path. Anat., etc., Berl., 1889, cxviii, 24 and 32, and others. Differences in the driving power have been shown by Hess: Deutsch. Arch. f. klin. Med., 1886-7, xl, 105. A balloon in the dog's intestine was fastened to a thread which came out of a gastric fistula and ran over a pulley. At the end of the string was a little bag which could be filled with shot until its weight stopped the progress of the balloon. Eighteen cm. from the pylorus 228.5 gm. were needed; 38 cm. from the pylorus 90.4 gm. were needed; 50 cm. from the pylorus 75.5 gm. were needed.
6. Erlanger: Arch. Int. Med., 1913, xi, 334.
7. Gaskell: Schäfer's Textbook of Physiol., London, 1900, ii, 184.
8. Von Brücke: Arch. f. d. ges. Physiol., 1905, cviii, 209
9. Cannon: Am. Jour. Physiol., 1909, xxiii, xxvii.
10. Cannon: Am. Jour. Physiol., 1912, xxx, 119.
11. Cannon: Am. Jour. Physiol., 1909, xxiii, xxvii. "A ring at the cecum repeatedly sends off downward running waves; a new ring made now near the terminus of these waves starts reversed waves; and a tonic ring made midway in the proximal colon not infrequently will originate waves which pass away in both directions." Cannon: Arch. Int. Med., 1911, viii, 419.
12. See papers by Bottazzi on the *Aplysia*, a large marine slug: Jour. Physiol., 1897-98, xxii, 481, and v. Brücke: Arch. f. d. ges. Physiol., 1905, cviii, 202; Bottazzi on some fishes, Ztschr. f. Biol., 1902, xliii, 364, and Hardy and McDougall on lower crustaceans, Proc. Cambridge Philosoph. Soc., 1893, viii, 41. A valuable point brought out in these studies and, I believe, largely applicable to man, is that material does not press up to and pack against the sphincters. The real barrier is not the sphincter, but a ring of muscle with high tone and inherent rhythmicity, placed around or just above the valve. This not only blocks impulses coming down, but starts up reverse waves that protect the sphincter from being put under pressure. I have shown how the sacculus rotundus may protect the ileocecal sphincter of the rabbit. Alvarez: Am. Jour. Physiol., 1914, xxxv, 184. A similar thickening has been described in man by Keith: Jour. Anat. and Physiol., 1903, xxxviii, 7, and Elliott: Jour. Physiol., 1904, xxxi, 158. The greater tone of the lower end of the colon in man serves the same purpose, probably, as do the pulsating tonus rings that guard the anus in the above-mentioned fishes and crustaceans.

nize this simple mechanism in the much elongated and more specialized gut of a mammal, but there is considerable evidence that short nerve paths through Auerbach's plexus, and longer paths through the mesentery and ganglia keep the stomach and cecum as close together, functionally, as they are in a snail or a frog.[13]

CLOSE CONNECTION OF VARIOUS PARTS OF TRACT

The use of a number of enterographs at one time, particularly in the cat, has shown me how immediate is the response of one part of the tract to changes in tone and activity in another. In addition, what might be called ripples, invisible to any one watching the bowel, can plainly be seen on the records, running in a few seconds from the pylorus to the colon. Now and then these ripples show themselves as short, diastaltic rushes, much perhaps as a swell from the ocean striking a shallow shelf suddenly becomes a comber. Without the graphic record no one would think of associating a short rush 200 cm. from the pylorus with a particular gastric contraction or with a sudden cessation of colonic activity. Bayliss and Starling have well said that, "every point of the intestine is in a state of activity, which can be played upon and modified by impulses arriving at it from all portions of the gut above and below."[14] The promptness with which a mouthful of food introduced in the stomach causes material to pass through the ileocecal valve[15] or to rush through the colon,[16] shows that the human intestine also acts very much as a short unit.

THE THEORY

Returning, then, to the idea of a tube with greater tone and rhythmicity at the oral end, it is apparent that a rise of tone at the upper end, due to the introduction of food or to irritating lesions, would hurry the aboral progress of food; while a similar rise at the lower end should slow the current or even reverse it. A rise anywhere in the middle of the tube should cause material to flow both ways from that point.

A more rapid current might be brought about also by lowering the tone of the lower end.[17] If the gradient of forces should become a horizontal line, no progress could be made, no matter how great the activity throughout the tube.[18]

While much work yet remains to be done on animals before such a theory can be firmly established, it seems worth while, at this time, to go over the literature of the laboratory worker, the clinician, the surgeon, and particularly of the radiologist, to see how well this hypothesis accords with the facts already at hand. Physiologic methods (Roentgen ray, gastric analysis, etc.) in the hands of the clinician have been yielding results that are not to be despised even if Dame Pathology did arrange the experiment; and an ill-assorted collection of observations awaits only the systematizing touch of a basic theory.

That the rhythmic segmentation of food anywhere in the tract is associated with a rise of tone has been well proved.[19] That irritating lesions also raise the local tone is the daily experience of the radiologist. The spastic pylorus or hour-glass stomach with adjacent ulcer, and the hypertonic stomach and duodenum in duodenal lesions bear witness to this point.[20]

The word tone may have to be used rather loosely in this paper for the sake of brevity. We cannot tell yet what part other factors — such as differences in rhythm and irritability — play in altering the gradient of forces through the tract.[21] The words higher and lower, which will appear frequently in the following pages, refer to differences in tone and muscular force and have absolutely no relation to position in the abdomen, or to gravity. I trust no one will misunderstand or forget this point. There are enough surgeons already who tinker at the bowel as if it were a coil of rigid tubing always held in one position. The intestine is a muscular organ and "material does not move along the canal unless the pressure is greater on one side of it than on the other."[22]

THE EFFECTS OF FOOD INTRODUCED AT THE UPPER END OF THE TRACT

It may sound like a Hibernianism, but food does go down the tract more easily because it is put in at the upper end. The rise of tone there probably makes the gradient of forces steeper down the intestine.[23] A contrast meal will go down the bowel faster if followed by more food a few hours later.[24] This second meal probably keeps the gradient steeper than usual by maintaining the high level of the gastric tone.

There is some evidence that pleasurable psychic stimuli still further raise this tone. Several observers have noticed that contrast meals leave the stomach more rapidly if they are made palatable.[25] "Sham

13. Roith describes two cases in which rectal injections brought about movements in the upper colon although the bowel in between was completely severed. Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1913, xxv, 208. Marbaix produced inhibition of gastric emptying by filling the jejunum, even after complete section of the duodenum, La Cellule, 1898, xiv, 282. Surmont and Dubus obtained immediate responses from the colons of dogs and cats by stimulating the duodenum, even after removing sections of ileum, Arch. d. Mal. l'App. dig., 1912, vi, 181.

14. Bayliss and Starling: Jour. Physiol., 1899, xxiv, 116.

15. Hertz: Jour. Physiol., 1913, xlvii, 53. I have observed the promptness of this reflex many times. Cole's observation—see note 66—is also very striking.

16. Meyer-Betz has seen the colon empty into the ampulla almost immediately after the patient took some food. Immediate postprandial desire for stool, or even diarrhea in children and some adults, is well known. München. med. Wchnschr., 1912, lix, 2717.

17. Material seems to go through the small intestine faster than usual when there is a large fistula in the terminal ileum or cecum. There seems ordinarily to be a retarding influence from the highly tonic colon. See Demarquay: L'Union med., 1874, xviii, 906; and Macewen: Lancet, London, 1904, ii, 998.

18. Katsch concludes that there is no proportion between the intensity of peristalsis and the progress of material through the tract. At times the food will move with ease through long stretches of an almost passive bowel, and yet the violent contractions produced by drugs like pilocarpin may have little forwarding effect. Ztschr. f. exper. Path. u. Therap., 1913, xii, 287 and 233. Bayliss and Starling, Jour. Physiol., 1900, xxvi, 126, and Kelling, Ztschr. f. Biol., 1903, xliv, 240, have shown that the waves frequently put no pressure on the contents of the gut.

19. Cannon: Arch. Int. Med., 1911, viii, 421. Mall: Johns Hopkins Hosp. Rep., 1896, i, 45. "If the intestine is at rest it is anemic, small and long; when digesting it is hyperemic, large and short." I have placed two markers 3.5 cm. apart on an active and apparently stretched piece of bowel and have found them 8 cm. apart later when this region had emptied and quieted down.

20. "I have always believed that the severity of the spasm resulting from an ulcer was dependent on its irritability and not on its size." Barclay: Arch. Roentg. Ray, 1913, xviii, 235. Schmieden gives it as a rule that, in ulcer, the healthy parts of the stomach contract; in carcinoma, the diseased parts. Arch. f. klin. Chir., 1911, xcvi, 265.

21. "The tonic state is fundamental. I have repeatedly attempted to call forth rhythmic contractions, both in the atonic colon and in the atonic stomach, by distention, but without success. The tonic state is therefore quite as important as the internal pressure; indeed, it is the condition for the existence of that pressure." Cannon: Am. Jour. Physiol., 1911, xxix, 242. See also Arch. Int. Med., 1911, viii, 417.

22. Cannon: Mechanical Factors of Digestion, London, 1912, p. 76. According to Keith, there is enough muscular tissue in the colonic wall of man to form a mass as large as the biceps of a blacksmith's arm. Brit. Jour. Surg., 1915, ii, 584.

23. During active digestion, the gradient of rhythm is made steeper by a rise in the duodenal region and a fall in the ileum. Alvarez: Am. Jour. Physiol., 1915, xxxvii, 277.

24. Hertz: Arch. Roentg. Ray, 1912, xvii, 216.

25. Hertz: Arch. Roentg. Ray, 1912, xvii, 219. See also Haudek and Stigler, who speak of slow gastric emptying when the food is taken without appetite, Arch. f. d. ges. Physiol., 1910, cxxxiii, 159. Also Gilmer: Centralbl. f. Roentgenstr., etc., 1911, ii, 235. Takahashi showed that cats' stomachs emptied half as fast when the animals were fed with a spoon as when they ate by themselves. Arch. f. d. ges. Physiol., 1914, clix, 389. Sailer believes that the bismuth meal leaves the stomach quicker if the patient drinks it than if it is put in by a tube, Univ. Penn. Med. Bull., 1906, xix, 136.

drinking," particularly in thirsty animals, will cause water to leave the stomach of a dog much faster than it otherwise would.[26] It will also prevent the backflow into the stomach which occurs when fat is put into the duodenum through a fistula.[27] The latter observation is explained if the pleasure of drinking has raised the tone of the stomach above that of the duodenum.

It is a common observation that patients who have vomited albumin water and other bland liquids for days may cease when given solid food. Good nurses are well acquainted with this trick and often stop postanesthetic vomiting with a little dry toast. Attacks of "cyclic" vomiting in children may also be stopped in this way.[28] I hope later to present evidence that vomiting is often a manifestation of reversed currents due to the presence of an abnormally high tone in the jejunum.[29] Water would probably not alter these conditions enough, as it passes rapidly into the intestine without having much effect on gastric tone. Solid food, however, can raise the tone of the stomach sufficiently to restore the normal gradient and to send the currents downward again.[30]

Cannon stated clearly in 1906 that "in whatever manner the pylorus may act under normal conditions, that action certainly can be overcome in abnormal states."[31] The other factors may simply modify the chemical control. For instance, increased pressure from above, brought about by a pleasant psychic influence,[32] or by distending the stomach,[33] will cause the pylorus to open before the chemical conditions are right. Cohnheim and Dreyfus[34] found in a dog, that when little food was present, 10 c.c. of stomach contents injected into the duodenum closed the pylorus for from ten to fifteen minutes; but when the stomach was full of fluid, the same stimulus stopped the flow for from only one to one and one-half minutes. The distention of the duodenum by a balloon,[35] the irritation of the bowel by strong saline solutions,[36] or the simple presence of neutral food in the upper half of the small intestine[37] will retard by hours the emptying of the stomach.

As Cannon reminds us, many of these observations can have little to do with physiology: food ordinarily shoots through the duodenum without distending or irritating it very much, but I believe they have much to do with pathology; and are of particular significance to those of us who, as clinicians, are dealing with abnormal states. It is unfortunate that all the efforts to explain the peculiarities of gastric emptying with gastric and duodenal ulcer and with carcinoma have been based on the chemical reflex alone. Von Bergmann and others have shown how impossible it is to trace any connection between the varying rates of emptying and the degrees of acidity in the individual cases.[38] We know also that the stomach gets along very well with complete achylia; and, although the emptying is a little more rapid, the intermittent spurts are very similar to those seen under normal conditions.

The slowing of gastric emptying by distending, irritating, or putting food into the bowel is explainable if we think of the intestinal tone as having been raised above that of the stomach. When the bowel empties and its tone falls, the stomach can empty again. The physiologic studies have not left it entirely clear as to whether the delay in gastric emptying is due to an inhibition of peristalsis or to pyloric spasm. A similar confusion is found in the clinical literature on six-hour stasis, where the terms pylorospasm, pyloric stenosis and gastric atony have been used almost interchangeably. Only a few men have observed closely enough to note that the stomach often fails to empty in the presence of active and powerful peristalsis, even when the pylorus is easily patent, as shown by palpation under the screen.[39] Such a condition is explainable if the tone of the intestine is equal to that of the stomach. Material may then churn back and forth; the pylorus may be open, and yet no progress can take place.[40]

This balancing of forces between the stomach and intestine is probably at the bottom of many well-known phenomena. The ill effects on some people of eating between meals may be due to the slowing of the gastric emptying caused by the presence of the previous meal in the small intestine. In order to show duodenal stasis, Jordan[41] gives a bismuth meal an hour or so after

26. Best and Cohnheim: Ztschr. f. physiol. Chem., 1910, lxix, 116. The dog has an esophageal fistula in the neck so that water or food swallowed does not reach the stomach, hence the term "sham-feeding."

27. Best and Cohnheim: Ztschr. f. physiol. Chem., 1910, lxix, 125.

28. McClure: Am. Jour. Dis. Child., 1914, vii, 48. Hahn: Med. Klin., 1911, vii, 1452. Tobler: Deutsch. med. Wchnschr., 1914, xl, 1042. Bartlett: Am. Jour. Dis. Child., 1914, vii, 310.

29. I have graphic records from cats, and from a man with a fistula, showing that a marked rise in the tone of the jejunum preceded spontaneous vomiting. Strange to say, almost all writers on vomiting have apparently forgotten that there is such a thing as an intestine. Physicians think they can stop vomiting if only they can keep food out of the *stomach*. Cohnheim and Dreyfus produced nausea and vomiting in dogs repeatedly by distending the small intestine with a balloon. Ztschr. f. physiol. Chem., 1908, lviii, 56. Hirsch produced vomiting in dogs by giving solutions of organic acids. Acetic acid was most active in this regard, apparently because it had the least effect on the stomach and the most marked stimulating effect on the intestine. This produced back currents as shown by the flow of bile into the stomach. A weaker impulse, as from lactic acid, caused only a delay in gastric emptying. Centralbl. f. klin. Med., 1893, xiv, 380. That nausea is associated with a drop in gastric tone has been observed by Barclay: Brit. Med. Jour., 1910, ii, 539.

30. After the stomach has been quiet for some time with bismuth water, I have often seen it contract and start up active peristalsis immediately after the patient had eaten a small cracker.

31. Cannon: Am. Jour. Med. Sc., 1906, cxxxi, 569.

32. Cohnheim and Dreyfus: Ztschr. f. physiol. Chem., 1908, lviii, 57.

33. Marbaix found that 250 c.c. of water left his stomach twice as fast if he put in 250 c.c. of air on top of it. La Cellule, 1898, xiv, 280. Rieder comments on the more rapid emptying of the full stomach. München. med. Wchnschr., 1904, li, 1550. Turck marvels that a small test-breakfast will remain in an atonic stomach longer than will a large Leube meal, THE JOURNAL A. M. A., 1904, xlii, 815. Ludin found that food taken after a contrast meal may hasten gastric emptying. Deutsch. med. Wchnschr., 1913, xxxix, 1239. See also Moritz: Ztschr. f. Biol., 1901, xlii, 505.

34. Cohnheim and Dreyfus: Ztschr. f. physiol. Chem., 1908, lviii, 58.

35. Tobler: Ztschr. f. physiol. Chem., 1905, xlv, 185.

36. Cohnheim and Dreyfus: Ztschr. f. physiol. Chem., 1908, lviii, 58. Four per cent. solutions of sodium chlorid and magnesium sulphate put into the upper bowel through a fistula caused diarrhea with marked slowing of gastric emptying, nausea and even vomiting.

37. An introduction to the literature on this subject may be had through the articles of Best and Cohnheim: München. med. Wchnschr., 1911, lviii, 2732. Marbaix: La Cellule, 1898, xiv, 268. V. Mering: Verhandl. d. Congr. f. inn. Med., 1893, p. 476. Hirsch: Centralbl. f. klin. Med., 1893, xiv, 377. Baumstark and Cohnheim: Ztschr. f. physiol. Chem., 1910, lxv, 484. Baumstark: Ztschr. f. physiol. Chem., 1913, lxxxiv, 437. Thomsen: Ibid., p. 425.

38. Von Bergmann, G.: Centralbl. f. Roentgenstr., etc., 1913, iv, 3. See also Faulhaber and v. Redwitz: Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1914, xxviii, 192.

39. Holzknecht and Haudek: Fortschr. a. d. Geb. d. Roentgenstr., 1914, xxi, 634.

40. Cannon and Blake state clearly that after pyloroplasty the function of the pylorus is taken over by the active contractions of the duodenum, Ann. Surg., 1905, xli, 708. Dagaew removed the powerful pyloric end of the stomach, expecting that this would allow the food to run promptly into the bowel. Just the reverse happened; there was marked delay which seemed to be due to the lack of pressure from above to overcome the resistance of the active intestine. As we should expect, the usual regurgitation into the almost empty stomach was much exaggerated. Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1913, xxvi, 179. Marbaix speaks of the contest between the stomach and intestine, La Cellule, 1898, xiv, 283. The larva of *Ptychoptera contaminata* has no pyloric valve, so van Gehuchten says the small intestine, in all its length, takes up the rôle of sphincter. La Cellule, 1890, vi, 277.

41. Jordan: Arch. Roentg. Ray, 1913, xviii, 231. He has seen strong contractions forcing the contents back into the duodenum. He told Barclay that, under ordinary conditions, he does not see such stasis. "The Stomach and Esophagus," London, 1913, p. 57. Hess found, in one experiment, that a balloon put through a fistula into the duodenum of a dog did not go forward as usual. This apparently was accounted for by the presence of food in the ileum at the time. Deutsch. Arch. f. klin. Med., 1866-7, xl, 105.

the patient has eaten his dinner. By that time the tone of the intestine has been raised by the presence of food and the contrast meal is held back when it reaches the duodenum.

It has been observed repeatedly that, at the close of gastric digestion, when the tone of the intestine is still high and that of the stomach has probably fallen, duodenal contents flow back into the stomach. This is particularly the case when much fat has been eaten.[42] The explanation for this lies probably in the fact that while the tone and motility of the stomach are markedly impaired in the presence of oils,[43] the intestine may, at the same time, be even stimulated by the fatty acids split off in pancreatic digestion.[44]

It is a common observation that a stomach will empty quite rapidly to a certain point, after which there is little change for hours. At first, through its greater tone or better reaction to distention, the stomach is probably stronger than the intestine. Later, the actively digesting bowel becomes too strong for the half-empty stomach, and there is little change until the intestine empties, or more food is put into the stomach.

Anything that tends to keep up the tone of the intestine will exaggerate this type of gastric emptying. I have seen it frequently in those cases, particularly of appendicitis, in which the ileum empties very slowly. This so-called "late pylorospasm" is quite characteristic also of duodenal ulcer.[45] There, I believe, the increased tone of the stomach, plus the stimulus of food, overcomes the hypertonic duodenum and brings about rapid emptying at the beginning. After this, a small residue remains in the stomach for hours, or until the next meal, presumably because the ulcer keeps the duodenum from relaxing to its proper tone level, below that of the stomach.[46]

INTRODUCTION OF FOOD AT THE LOWER END OF THE TRACT

According to the theory, food introduced at the lower end of the tract should retard the progress of material coming down from above and might even reverse the current. There is ample proof in the literature that both these things happen. Clinically, it is well known that an enema given shortly after a meal is likely to cause colic, nausea, and, in sensitive people, even vomiting.[47] Radiologists know that enemas must not be given after a bismuth meal if they are to tell anything about the emptying time of the stomach or the rate of passage through the small intestine.

The few times I have ordered rectal feeding I have had to give it up on account of nausea and vomiting, which ceased only when the enemas were stopped. To illustrate: A woman with a blood pressure of 220 mm. of mercury and no clinical or radiologic signs of ulcer, before or since, had been passing tarry stools for several days. Rectal feeding and a Murphy drip were started, and only a little water was given by mouth. Fearful nausea began, and soon she was vomiting large amounts of blood-stained fluid. No blood reached the anus while she was being fed per rectum. The vomiting became so serious that we then left the rectum entirely alone and gave her solid food. Nausea and vomiting stopped with the first mouthful and did not return. Tarry stools appeared again. Apparently the blood, oozing somewhere in the middle of the digestive tract, could be sent in either direction by raising the tone of either end.

Rolleston and Jex-Blake[48] collected ninety-six cases of gastric ulcer fed per rectum alone and found that twenty-six patients vomited on one or more occasions. They noticed that the giving of cleansing enemas to these rectally fed patients frequently produced nausea and retching, and, in a few cases, it brought on vomiting. There are enough cases in the literature in which the enemas were actually vomited, or in which the patient objected to the constant taste of the peptonized foods.[49]

Several observers have noticed an increased tendency to colonic anastalsis after the giving of enemas.[50] The Roentgen ray has shown how frequently enemas will pass through the ileocecal valve and run up the small intestine even to the stomach. As would be expected from the theory, this is more likely to occur when some lesion in the colon has already raised the tone of the lower end of the tract.[51]

FOOD PUT INTO THE MIDDLE OF THE BOWEL TENDS TO MOVE BOTH WAYS

My experiences with jejunal feeding have not been entirely satisfactory on account of the nausea and vomiting which occurred from time to time.[52] Food put in at the fistula has even been returned by mouth; and in most of the cases the discomfort could be relieved only by simultaneous mouth feeding. Here again vomiting was stopped probably by raising the tone of the stomach to its normal position above that of the jejunum. Nausea, vomiting and pain were present in another case until a simultaneous Murphy drip of glucose and salt solution was stopped, and some food given by mouth. The patient had no further trouble until one day when he had a cleansing enema.

42. Boldireff states that in animals that have been fasting for some time, the intestinal juice will run out of a gastric fistula continuously. This back-flow can be accentuated by giving fatty acids and fats or by injecting some 0.1 per cent. HCl into an intestinal fistula. Centralbl. f. Physiol., 1904, xviii, 457. Rehfuss, Bergheim and Hawk found bile present in the fasting stomachs of most of the normal students studied. THE JOURNAL A. M. A., July 4, 1914, p. 11. Years ago Kussmaul said "Offenbar gelangt die Galle viel leichter in den leer als in den vollen Magen." Samml. klin. Vortr., Inn. Med., 1880, No. 62, p. 1651.

43. V. Tabora says the stomach may be quiet for hours when full of fat. Centralbl. f. Roentgenstr., 1911, ii, 247. Cannon says the waves were a little slower and shallower. Am. Jour. Physiol., 1907, xx, 315.

44. Bokai: Arch. f. exper. Path. u. Pharmakol., 1887, xxiv, 158. For further discussion of this subject and references to the literature see Cannon: Am. Jour. Physiol., 1907, xx, 315.

45. Carman: THE JOURNAL A. M. A., March 28, 1914, p. 980.

46. This may be the explanation for Cannon and Murphy's observation that food did not begin to leave the stomach for five or six hours after section and suture of the duodenum, some 10 inches below the pylorus. Am. Jour. Med. Sc., 1906, cxxxi, 569.

47. Trousseau and Sydenham have discussed this point. The latter warns us that clysters become emetics in cases of ileus and typhoid where there is already a tendency to a reversal of intestinal action. Clin. med., Paris, 1865, iii, 28; Sydenham Soc. Edit., London, 1848, i, 67, 68 and 194.

48. Rolleston and Jex-Blake: Brit. Med. Jour., 1903, ii, 68. Bine and Schmoll have given up rectal feeding on account of such experiences, California State Jour. Med., 1914, xii, 364.

49. Parkes-Weber: Brain, 1904, xxvii, 170, and Langmann: Jacobi Festschr., New York, 1900, p. 375, give a good introduction to the literature on this subject.

50. Cannon: Mechanical Factors of Digestion, p. 150. In one cat an enema of warm water caused continuous anastalsis in the colon for one hour and twenty minutes. Ordinarily such waves appear from time to time only. See also Nothnagel: Beitr. z. physiol. u. path. d. Darmes, Berl., 1884, p. 20.

51. Case finds incompetency of the ileocecal valve associated most frequently with the increased antiperistalsis of hypertonic constipation, and with obstruction and disease of the colon. The incompetence of the valve is not a disease in itself; it is secondary, and due to a loss of tone in the muscle making up the valve. He quotes a number of authors who agree with him. Arch. Roentg. Ray, 1915, xix, 380 and 383.

52. Kelling speaks of the stagnation of food in the stomach, feeling of fulness and tendency to vomiting in jejunal feeding. Ztschr. f. Biol., 1903, xliv, 248. "In the majority of cases, direct nutrition through the duodenum is a delusion. The chyme, or the greater part of it, is regurgitated into the stomach, as can be demonstrated fluoroscopically"; Therapeutics of the Gastro-Intestinal Tract, Wegele, Gross and Held, New York, 1913, p. 272.

It is common knowledge that vomiting is often associated with diarrhea. A small boy who has eaten all the blackberries he can pick is likely to vomit three quarters of the amount some hours later; and shortly after, the remainder is voided in loose movements. Presumably, enough of the irritant mess gets into the jejunum at the start to prevent the stomach from emptying.[53] Finally the tone becomes high enough in the upper bowel so that it can clear itself both ways. Strong psychic stimuli may bring about diarrhea and vomiting in the same way, if they raise the tone of the upper jejunum at the point where it is so richly supplied with vagus branches.[54]

IRRITANT LESIONS

The motility of the tract is affected by irritating lesions, much as the theoretic considerations would lead us to expect. One of the best roentgenologic signs of duodenal ulcer is the presence of the head of the bismuth column in the descending colon after six hours. This is not pathognomonic of ulcer, but points to some irritation of the duodenum or the closely related gallbladder and pancreas.

It appears also with hypertonic stomachs, due in some cases apparently to vagus disturbances. Another factor in the causation of this hypermotility is the rapid outpouring of food from the stomach in duodenal ulcer, achylia gastrica and some cases of gastroenterostomy.[55] The greater distention alone may stimulate the upper bowel to greater activity, much as a large enema has more effect than a small one.

The problems of motility with lesions at the upper end of the tract are complicated by the fact that the whole region from cardia to jejunum seems to have its tone raised by a lesion in the duodenum, or in the embryologically related bile passages, liver and pancreas. This is shown by the hypertonic stomachs and the hour-glass contractures so frequently seen in these cases.[56]

The reaction of the stomach to ulcer is also complicated by so many factors that I will not try to discuss the subject at this time. The stomach is often atonic and quiet with pyloric ulcer;[57] possibly the waves are blocked by the tonus ring caused by the lesion. Actual reverse waves are often seen, particularly when the bismuth is taken at a time when a previous meal is in the intestine.[58] Under these conditions, as we have seen, there is a considerable tendency to back-flow at the upper end of the tract.

That gastric anastalsis is seldom seen with duodenal ulcer[59] is due probably to the almost complete break in continuity of the muscular coats at the pylorus.[60] This barrier deserves more study, as it may be of immense importance to us in blocking undesirable waves coming up from the intestine, and in protecting the bowel from undue influence from the powerful pyloric portion of the stomach.

Jonas has shown that just as intestinal hypermotility and even diarrhea may appear when the stomach empties too rapidly, hypomotility of the bowel and constipation are seen with lesions interfering with the opening of the pylorus. He speaks of the stomach as the *"Haupt-motor"* for the intestine.[61]

Lesions in the course of the bowel, such as tuberculous ulceration, render the affected area so irritable that the bismuth meal goes through very rapidly, and this region appears to be empty.[62] The bowel is often empty for some distance above an obstruction, showing that there is a powerful repelling effect.[63] For the same reason, in appendicitis, the last few coils of ileum may be empty; or the lower limit of the bismuth, instead of showing a bulging shoulder, tapers to a point. The obstruction is not mechanical, it is dynamic. It is becoming generally recognized that a kink in the bowel has little effect unless it becomes irritated in some way. The marked differences in severity, amount of vomiting, etc., between acute ileus and that arising slowly may depend partly on the degree to which the cause of obstruction irritates the bowel, raises the local tone and reverses the current.[64]

The commonest lesion near the ileocecal valve is appendicitis; and this, as is well known, can generally be diagnosed by the presence of marked ileac stasis. I believe chronic appendicitis disturbs digestion mainly through its effect in raising the tone of the terminal ileum; and operations give relief only as they remove all sources of irritation from this region.[65] A rise of tone here has a retarding effect that extends upward even to the stomach, which is frequently

53. Baumstark has shown that fermented food put through fistulas into various parts of the intestine will greatly slow the emptying of the stomach. Ztschr. f. physiol. Chem., 1913, xxxiv, 437.

54. Alvarez: Am. Jour. Physiol., 1915, xxxvii, 276.

55. Hertz: Ann. Surg., 1913, lviii, 466, and Moynihan: Abdominal Operations, Philadelphia, 1906, p. 221, have seen even fatal diarrhea after gastro-enterostomy when the stomach emptied too rapidly.

56. Hertz: Guy's Hosp. Rep., 1907, lxi, 403. Case: Jour. Michigan State Med. Soc., 1913, xii, 577. Carman: THE JOURNAL A. M. A., March 28, 1914, p. 980. Eisler: Centralbl. f. Roentgenstr., etc., 1912, iii, 320. Schlesinger: Berl. klin. Wchnschr., 1912, xlix, 1223. Holzknecht and Luger: Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1913, xxvi, 669.

57. Barclay says when he cannot provoke any gastric peristalsis he always suspects a lesion at the pylorus. Brit. Med. Jour., 1910, ii, 539. Carman: THE JOURNAL A. M. A., March 28, 1914, p. 980. Kreuzfuchs believes that hypertonus of the pyloric end causes hypotonus of the body of the stomach, Wien. med. Wchnschr., 1912, lxii, 1073. The blocking of waves by a tonus ring is described by Cannon: Mechanical Factors in Digestion, p. 188.

58. Haudek: Wien. med. Wchnschr., 1912, lxii, 1061.

59. Once in ninety cases, Haudek: Wien. med. Wchnschr., 1912, lxii, 1061. Carman has never seen it. THE JOURNAL A. M. A., March 28, 1914, p. 980.

60. Cunningham: Tr. Roy. Soc. Edinburgh, 1905-7, xlv, 9. Brinton: Diseases of the Stomach, London, 1859, p. 268.

61. Jonas: Arch. f. Verdauungskr., 1912, xviii, 769. Agéron holds similar views, ibid., 1911, xvii, 584. Dugnew found that food reached the lower ileum in thirteen hours instead of six after removal of the strong pyloric muscle. Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1913, xxvi, 179. Cohn found in a case of complete removal of the stomach and vagus endings that food went very slowly through the bowel, reaching the cecum only after twenty-four hours. Berl. klin. Wchnschr., 1913, l, 1393. Cole has noticed that the cecum fails to empty for a long time if the patient does not eat after the contrast meal. Am. Jour. Med. Sc., 1914, cxlviii, 110.

62. Stierlin: Centralbl. f. Roentgenstr., 1911, ii, 254. Case describes the emptiness of the cecum in cecal tuberculosis. Arch. Roentg. Ray, 1915, xix, 381. Kienbock discusses the subject at more length in Fortschr. a. d. Geb. d. Roentgenstr., 1913, xx, 231. Nothnagel says food is rushed through sections of bowel that have been inflamed and made irritable by the injection of concentrated salt solutions. Beitr. f. Physiol. u. Path. d. Darmes, 1884, p. 39.

63. Kirstein: Deutsch. med. Wchnschr., 1889, xv, 1000. Kelling: Ztschr. f. Biol., 1903, xliv, 249. Reichel: Deutsch. Ztschr. f. Chir., 1892-93, xxxv, 551. Nothnagel: Beitr. z. Physiol. u. Path. d. Darmes, 1884, p. 29. Quirot: Thèse de Paris, 1909, p. 25. These men have all remarked on the contracted, empty state of the bowel above the obstruction, and the signs of anastalsis a long distance above. Shimodaira: Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1910, xxii, 229, and Maleyx, These de Paris, 1912, have written monographs on the well-known distention and ulceration of the cecum with obstruction in the lower colon.

64. Kirstein: Deutsch. med. Wchnschr., 1889, xv, 1001, thinks acute ileus is not the result of closure of the bowel but of its maltreatment. When he cut the ileum across and sewed it up, the food went on down the intestine and packed against the obstruction. The dogs did not vomit, and finally died of starvation. When, however, he pinched the bowel with an elastic ligature, the food was turned back in the duodenum and the dogs were very sick. Treves says that in acute intussusception, violent symptoms of obstruction may run their course without there having been produced any actual occlusion of the bowel. He believes the symptoms are due to what he calls peritonism, Intestinal Obstruction, New York, 1902, p. 2. These mechanical factors should not be lost sight of, although the recent work on intestinal obstruction shows the problem to be quite complicated.

65. Barclay: Brit. Jour. Surg., 1915, ii, 645. According to the theory, we would expect to find hypermotility in the colon with appendicitis. Deaver says diarrhea is present in about 13 per cent. of cases. It is met with more often in children. Appendicitis, Philadelphia, 1905, p. 226 and 244. That it is not seen more frequently is due probably to the powerful repelling effect from the lower colon.

dilated and atonic. The duodenum is often dilated, and material stagnates either in the "cap" or just above the duodenojejunal junction.[66] That this is not due to kinks or adhesions is shown by the fact that the swallowing of a mouthful of solid food generally causes this bismuth to whisk over into the jejunum. This region has also been found normal at subsequent operation in several cases. I have seen active reverse peristalsis in the duodenum due to the ileac stasis alone.

Back pressure from the intestine must be looked for in all cases of gastric atony or deficient emptying when no lesion can be found near the pylorus. Several writers have emphasized the importance of gastric dilatation as an early sign of intestinal obstruction. It can be detected with the stomach tube and Roentgen ray some time before the reverse currents are strong enough to cause the typical vomiting.[67]

There is a so-called gastric type of carcinoma of the lower colon in which nausea, vomiting and gastric dilatation are the early symptoms of the ascending influences.[68] The descending ones show themselves later in tenesmus and protrusion of the rectal mucosa.

CONSTIPATION

In sensitive people and in children, constipation may cause vomiting which will yield promptly to a laxative. These patients may feel stuffed after a few mouthfuls, on account of the reverse influences.[69] Conditions seem to be somewhat as they are in baseball when the bases are full and the batter has made a hit: there is no use of his running if the runner on third refuses to come "home." The intestine may also be thought of as a railroad under control of a block system. Just as food in the stomach forces material through the ileocecal valve or into the rectum when the tract in between is empty, the stagnation of material in a lower block will hold up the food for several blocks above.

Future experiments must show how much actual reverse waves or ripples have to do with the process. The reverse influences seem to skip over regions in which the waves are catastaltic to cause anastalsis above. The direction of peristalsis may change also from time to time in the same stretch of bowel. All these observations are explainable in the light of the theory.

A large part of what is called "biliousness" and "autointoxication" may be due to this tendency to reverse peristalsis when the colon remains filled and active. "Biliousness" derives its name from the appearance of bile in regurgitated material, and this would be more liable to occur when the tone of the intestine is higher than that of the stomach. Much of the satisfaction that the "bilious" get from a dose of calomel may be due to the setting of a strong current down the tract again. The symptoms in the "autointoxicated" ordinarily clear up within a few minutes after emptying the rectum, and no toxin could be eliminated at that rate.

There seems little doubt that normally the tone of the rectum and sigmoid is higher than that of the cecum and ascending colon.[70] This tends to protect the anal sphincter and to keep feces out of the ampulla except during those times when the pressure from the upper part of the tract is very great. Material which is forced over into the rectum may even be returned to the transverse colon if defecation is postponed.[71] The commonest cause of constipation is probably an increase of this tone which makes the gradient steeper up to the rectum.[72] Case has found adhesions irritating the pelvic colon in a number of these cases.[73]

Hemorrhoids and painful fissures may cause constipation not only on acount of the fear of pain at defecation but by raising the tone of the rectum, and thereby keeping the sigmoid and ampulla empty. This holding back is often shown by a large accumulation of gas in the splenic flexure. This is so constant a finding that I have come to regard a large tympanitic Traube's space as almost diagnostic of hemorrhoids.

CONCLUSION

It was natural that when the Roentgen ray first threw light on conditions in the digestive tract, the striking defects, as seen in carcinoma and ulcer, and the marked ptoses, so different from what anatomists had taught us to expect, should have occupied the center of the stage. Soon the more thoughful radiologists began to realize that it was only occasionally that they could see the lesion, or, more correctly, a cast of the lesion. In the large proportion of cases they could only suspect the presence of some irritant from the altered motility in different parts of the tract. Finding marked ptoses and kinks every day in people with good digestions, they began to see that a stomach might empty just as satisfactorily when in the pelvis as when above the navel. As Case says, "with increasing experience, the morphological factors have shrunk in importance, while the problems relating to the functional behavior of the alimentary tract have assumed greater significance."[74]

Some good may be done by this article if it helps at this time to bring about a more physiologic point of view in gastro-enterology; if it induces more men to think of the tract as a unit, and to study it from one end to the other before they make diagnoses, or attempt repairs at any one point. Good men are still reporting statistics on gastric ulcer, six-hour stasis, etc., without making mention of conditions even as far away as the gallbladder. Surgeons are doing gastro-enterostomies on baggy stomachs when the offending appendix should come out instead. How much better it would be to explore the tract carefully before beginning work on

66. I have observed these things many times. See articles by Borgbjärg: Verzögerung der Magenentleerung bei Darmkrankheiten, Arch. Verdauungskr., 1911, xvii, 706. Bassler: THE JOURNAL A. M. A., Oct. 24, 1914, p. 1469. Eisen, Ibid., p. 1228. Barclay: Arch. Roentg. Ray, 1913, xviii, 234. Patterson and other surgeons have seen at operation marked dilatation of stomach and duodenum in many cases of appendicitis. Proc. Roy. Soc. Med. London, 1910, iii, Surg. Sect., p. 197. Of 482 cases with gastric stasis due to ascending influences, only twenty-one showed retention after the removal of appendices or the resolution of normal conditions in the bile tract. Smithies: Am. Jour. Med. Sc., 1915, cxlix, 187. Cole says, "I have observed time and time again that if, after the contents of the stomach and 'cap' have remained stationary for some time, the ileum be partly evacuated, a rehabilitation of duodenal peristalsis will be established forthwith and food may be seen . . . passing through the jejunum." Am. Jour. Med. Sc., 1914, cxlviii, 109. Barclay has made similar observations, Brit. Jour. Surg., 1915, ii, 643.

67. Ewald: Berl. klin. Wchnschr., 1907, xlix, 1416. Cataldi: Policlinico, Rome, 1914, xxi; abstr., THE JOURNAL A. M. A., Jan. 23, 1915, p. 378.

68. Quirot: Thèse de Paris, 1909. Hedblom and Cannon's experiments are in accord with these clinical observations. When they irritated the colons of cats with croton oil, the stomachs emptied very slowly in spite of active peristalsis; and there was great retardation in the small intestine also. Am. Jour. Med. Sc., 1909, cxxxviii, 520.

69. Hertz found patients could eat little at a time and complained of a sense of fulness when the stomach emptied too fast after a gastro-enterostomy. This disagreeable sensation was less after taking castor oil, apparently because the jejunum emptied faster, Ann. Surg., 1913, lviii, 466.

70. Rost: Verhandl. d. deutsch. Gesellsch. f. Chir., 1912, p. 169.

71. See a very interesting article by Campbell: Tr. Am. Gynec. Soc., 1878, p. 286. Also Schwarz: München. med. Wchnschr., 1912, lix, 2155.

72. Singer and Holzknecht: München. med. Wchnschr., 1911, lviii, 2536. Keith: Brit. Jour. Surg., 1915, ii, 581.

73. Case: Arch. Roentg. Ray, 1915, xix, 380.

74. Case: Arch. Roentg. Ray, 1915, xix, 375.

some part which, as Mayo says, may be the fire-alarm and not the fire.

In the last two years I have found it a very useful rule to remember that: *an irritating lesion slows the progress of food coming toward it from above and hastens the progress of food that has passed it.* This has helped in analyzing many unusual cases. For instance, a number of signs may point to a duodenal ulcer, yet the usual hypermotility is lacking. Further study may show that this has been neutralized by the back pressure from a chronic appendix.

In such a short paper little can be done except to present views that can be discussed in more detail later. Such papers that may follow can more easily be seen then in their relations to the whole problem. More proof can be adduced for many of the statements made here, and objections can then be taken up.

In closing I wish gratefully to acknowledge my indebtedness to Dr. Cannon of the Department of Physiology at Harvard, to Dr. Pope of the Surgical Research Laboratory at the University of California and to Dr. Whipple of the Hooper Research Foundation who, one after the other, in the last two years, have so generously afforded me the opportunities to work on this problem.

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ABSTRACT OF DISCUSSION

Dr. L. B. Wilson, Rochester, Minn.: I should like to ask Dr. Alvarez to tell us briefly what the factors are which he has been able to use experimentally in increasing the tonus, and those which he has been able to use experimentally in decreasing the tonus; and how he knew that he increased and decreased the tonus under those conditions.

Dr. Walter C. Alvarez, San Francisco: My reasons for believing that the tone of the bowel is raised by the giving of food or by irritating lesions are given in the paper. I have some evidence that irritation, or the presence of food, can alter the gradient of rhythm. In one rabbit with a very active and irritable cecum, the lower ileum contracted eighteen times per minute instead of the usual eight or ten. Considerable reverse peristalsis could be produced in this animal by injecting a little of the cecal contents into the terminal ileum, hence possibly the gradient of tone had also changed. The theory will be placed on a much firmer foundation when we know more about the way in which the tone is graded from one part of the tract to the other. In this paper I have had to assume that it follows somewhat the gradient of rhythm already established. Work is now being done on this and other phases of the problem. In the meantime it does seem permissible to call attention to the beautiful way in which a large number of observations fit into such a theory as is here presented.

Policemen Assist Health Department.—An experiment in cooperation between the police department through its patrolmen and the health department has been in progress since May 17, in Health District No. 1, in the lower East Side of Manhattan. The work has gone smoothly from the start, the policemen are interested in the work and the results obtained are better. Complaints and requests for assistance of various kinds submitted by physicians, field nurses and food and sanitary inspectors of the district are assigned with brief verbal explanations to the outgoing squad of patrolmen. The assignments are simple and call only for an "O.K." or "Not O.K." by the patrolman and clerical work is avoided. The policemen are also instructed as to sanitary nuisances and what action to take in regard to them. The time required of the patrolmen is not over ten minutes a day for such assignments and talks. Arrangements are under way to give instruction in sanitary matters of new policemen by the Bureau of Public Health Education of the Department of Health. The work of the patrolmen has been of great assistance to the department.

SPINAL CORD COMPRESSION FROM LEPTOMENINGEAL CYSTS

WITH A REPORT OF TWO CASES *

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The two cases which are incorporated in this report, and about which revolves the discussion of the subject of nonparasitic cysts of the leptomeninges of the spinal cord, are found to be quite uncommon, even though a most thorough search of the literature is made. The bulk of the reported arachnoidean cysts have for their etiology either the cysticercus or echinococcus, which means that they are multiple and complicated. Moreover, it is highly important that the simple, nonparasitic cysts like those which I am placing on record be recognized early, so that immediate proper operative intervention may be instituted. Then a fair prognosis may be offered.

A plea for an early recognition of the nature of the trouble is a chief motive for placing before the profession a report of my two interesting and instructive cases.

The first patient was in an extreme paraplegic state when first observed. Operative treatment improved her condition but not in a satisfactory manner. The second patient came under my observation in an earlier stage, and with a prompt operation and good after-care made a much better recovery.

REPORT OF CASES

Case 1.—The patient (V. J., single, aged 37, tailoress) was referred to me for diagnosis by Dr. Gray, who performed the operation at St. Margaret's Hospital, which she entered July 10, 1912. She complained of inability to walk on account of a paralysis in the lower extremities, pain about region of lower ribs, feeling of numbness in the legs, and loss of control for urination and defecation.

Family.—Father is living, aged 87. He is suffering from a recent progressing senile enfeeblement. Mother died of pneumonia at the age of 73. Patient has three living brothers, all well; two brothers died, one at 22 and the other at 44 of tuberculosis. There are two healthy living sisters. One sister died of "heart disease" at 49, and another of tuberculosis at 23.

Past Illness.—Patient has had measles and epidemic parotitis. The menses were established at the age of 15. There has been some dysmenorrhea but no leukorrhea. Since the age of 16 there have been attacks of "stiff neck" lasting two or three days. Seven years ago there was an eruption below the knees without itching. There was some backache and headache at the time, but no sore throat, alopecia nor subsequent pains. Recovery was prompt.

Present Trouble.—The onset dates from about July, 1909, when patient awoke one morning with a feeling of numbness in the right leg. There was much difficulty in walking and no work was done for one week. Then followed a period in which she was able to work but there was present always a numbness and trouble in walking. Sharp pains around the waist and in the lower chest appeared early. Three weeks before entering the hospital the condition grew rapidly worse and the patient became bedridden. The left leg had become severely involved also. A loss of rectal control and urinary retention with a subsequent overflow and dribbling had appeared. Uncontrollable jerkings of the legs had been present a few weeks. There had been no headaches or vomiting.

* Read before the Section on Nervous and Mental Diseases at the Sixty-Sixth Annual Session of the American Medical Association, San Francisco, June, 1915.

Examination.—The mental condition was normal and the physical condition good. The head, chest and upper extremities gave normal findings. The patient was unable to move her lower extremities voluntarily. The paraplegia was of the flaccid type. The abdominal muscles were weak. There were no trophic sores. Some muscular atrophy was present. All deep reflexes in the lower extremities were absent. No Babinski or allied phenomena were found. The abdominal reflexes were not present. All forms of sensation on the right side from the tenth dorsal segmental area downward were reduced, epicritic and protopathic greatly, and deep sensation to a lesser extent. The ninth dorsal segment showed some mild sensory changes, and the eighth dorsal very slight. On the left side there was a mild diminution for epicritic and protopathic sensibility from the first lumbar segment downward, deep pain sensibility being well preserved. The diagnosis of a cord compression with a corresponding progressing transverse myelitis and tract degenerations was made. A neoplasm or a cyst was indicated. It was located as extramedullary and probably within the dura. The sensory chart localized the lesion at the eighth dorsal segment with possibly some compression on the seventh. An operation was advised at the fifth, sixth and seventh dorsal vertebrae.

Operation.—A laminectomy at the region indicated was performed on July 12, 1912, by Dr. Gray with Dr. Nesselrode assisting. The dura in this region seemed quite tense and had a bluish color. Opening it revealed an arachnoidean pocket of fluid. Its diaphanous wall was torn through, and following the evacuation there was hardly any of the pathologic structure visible. The contained fluid was clear, having to the naked eye the same appearance as normal cerebrospinal fluid. There followed an escape of much cerebrospinal fluid. The cord had the evidence of much local compression. It was visibly diminished in size at the eighth and ninth dorsal segments. The dura and external wound were closed. There was an uneventful recovery from the operative procedure. During the first few weeks the condition remained much the same except for a diminution of the painful symptoms. The patient left the hospital after three weeks and was lost sight of. From Dr. Nesselrode and by the report of a lay friend in May, 1915, I have gathered that there has been a slow improvement of all the damaged functions. There are no pains. The patient complains of a weak back. She now has control of the urine and stools. The patient can move the lower extremities, but in a feeble manner. She can walk with crutches, or a cane and some additional support. Her general health is good.

CASE 2.—This patient (J. H.) was referred conjointly to the surgeon, Dr. Outland, and myself by Dr. O. P. Mills of Grant City, Mo. The diagnostic observations and treatment were conducted at the Swedish Hospital, Kansas City, Mo., where the patient entered on April 22, 1913. She was 42 years old, the mother of three healthy living children, the youngest being 6 years old. One child died of diphtheria at the age of 3. Her husband is healthy. They live on a prosperous farm.

Past History.—There has never been any serious illness or trauma. Some hemorrhoids have been present since the birth of the first child nineteen years ago. Patient has been subject to occasional "sick headaches." History regarding the menses and pelvic organs was negative. The menstrual flow has failed twice.

Present Illness.—The onset dates from about March 1, 1913, when a numb sensation was noticed in the left ankle. The numbness increased and had extended upward to the hip in three weeks. It was difficult for the patient to describe this state, which was somewhat vague, with creeping cold and hot flashes in the leg. There was no pain of consequence except when walking. The pain had diminished at the time of this examination. The right leg was involved two weeks later. There was a pressure sensation about the legs and waist much like a tight band. A weakness in the lower extremities soon appeared, which was evidenced by some difficulty in walking. There was some trouble or delay in micturition. There were frequently sudden desires to defecate, and much haste was necessary to reach the stool. About one year ago there were a few pains in the shoulders, and six months ago a slight attack of numbness of short duration in the legs. These may or may not have been the very earliest manifestations of the present disease.

First Examination.—The psychic state, general health, chest and upper extremities were perfectly normal. There were no traces of hysterical stigmata. The urine and blood analyses were normal. All tests of the cranial nerves gave normal findings.

Motor: The gait showed much defect but patient was able to get about without support. It had neither the true flaccid nor the spastic characteristic. The lower abdominal muscles showed a little weakness. Muscles governing all movements at hip, knee, ankle and toe joints evidenced considerable weakness, the smaller muscles in the distal parts having a greater amount of loss of power. The flexor groups seemed to be weaker than the extensors. The left side was slightly weaker than the right.

Reflexes: Abdominal reflexes could not be elicited. The gluteals were brisk. The patellars were exaggerated to a moderate degree, left more than right. Decided prepatellars were presented. The Achilles were likewise exaggerated, right equaling left. There were no clonuses. The toe sign was positive to the Babinski and Oppenheim tests, but in a rather moderate degree.

A marked diminution of epicritic, protopathic and deep sensation was present, beginning at an encircling line about 3 cm. below the umbilical level. From this up to the umbilical line there were undoubtedly some mild sensory changes to touch and pin-prick tests, but responses were often doubtful in this narrow zone. Above the umbilicus all forms of sensation were normal. The sensory changes began at the same level on the right and left. The thermal sense showed a definite loss from the umbilicus downward. There was noticed in particular a retardation of the responses, especially for the hot tubes. The diminution of the deep muscle sense was mild in the lower extremities. Sense of position was much changed in the legs, being more noticeable at the proximal joints in contrast with the distal. More than 50 per cent. of the tests at the toe and ankle joints yielded incorrect replies. The tuning-fork vibrations (256) were not perceptible at prominences of the pelvic bones or lower extremities. No vibrations were felt at the fifth lumbar spinous process. They were diminished at the fourth and normal at the third lumbar.

Second Examination (May 2, 1913).—The subjective symptoms had remained the same or possibly became more prominent. There had been some mild complaints of stomach and shoulder pains. The objective findings compared with the first examination, were entirely pronounced in every particular.

Rachiocentesis was performed on May 4, 1913, at the third intervertebral lumbar space. The pressure registered 350 mm., water gage, and with the patient in a sitting posture. After 30 c.c. were withdrawn the pressure was reduced to 260 mm. The fluid was clear, containing no flocculi. The total albumin content was slightly increased. Likewise there was shown a very feeble positive globulin content by the Nonne-Apelt and butyric acid tests. The Wassermann was negative. The lymphocyte (small and large) count was 12 per cubic mm. There was some débris, and amorphous and crystalline bodies. A number of organic bodies taking a rather heavy stain and appearing to be degenerated epithelial cells, were found. No parasitic organism of any kind, nor tumor cells could be demonstrated.

The diagnosis eliminated syphilis, in particular that of the meninges, also tuberculosis and other rarer chronic meningeal infections. A motor and sensory paraplegia makes it quite evident that there is organic disease or a compression at the lower dorsal spinal cord. A chronologic survey of the development and progress of the symptoms and examination findings invites the diagnosis of an extramedullary new growth or cyst with its upper pole surely at the eleventh dorsal cord segment and probably very mildly involving the tenth dorsal. The lower pole could not be located definitely.

The lesion has an intradural location. I stated that we were dealing with a cyst of the inner meninges or a very soft benign neoplasm. There were no hopes for checking the disease otherwise than by a surgical intervention. Accordingly I demanded an immediate laminectomy at the seventh and eighth dorsal vertebrae.

Operation.—The laminectomy was performed on May 7, 1913, by Dr. Outland, assisted by Dr. Clendening. After removal of the seventh and eighth dorsal laminae, there was seen, at the depth of the entire cavity produced, a decided bulging of the dura which was quite tense to palpation. There was diminished transmitted pulsation of the dura from the cord, and it had a passively congested appearance. The sixth dorsal lamina was then removed. The dura was cautiously opened, and a considerable amount of cerebrospinal fluid free in the subarachnoidean space escaped. Then there was seen distinctly a cyst covering the posterior surface of the cord, extending to each lateral side and longitudinally for a distance of about 2.5 cm. The cyst covered the entire eleventh and a portion of the tenth dorsal segments. It was undoubtedly an arachnoidean cyst with probably complete but exceedingly diaphanous walls. The cyst wall was torn through during a little traction. It was opened freely and all the fluid allowed to escape. Unfortunately none of the fluid, which was perfectly clear and had the same appearance as normal cerebrospinal fluid, was collected for chemical and microscopic examinations. The cyst does not belong to the echinococcus or cysticercus class. The cord with its closely adapted pia was now free to sight and palpation, and seemed normal. The dura was closed without drainage. This was followed by a closure of muscles, fascia and skin. A great deal of pain and peculiar vise-like cramps in the legs and lower abdomen were experienced for some days following the operation. With a gradual recession these disappeared in about two weeks. There was retention of urine for eleven days, or about until the patient commenced to sit up, when normal micturition appeared rather quickly.

Third Examinatioin (May 22, 1913).—The patient walked unsupported but somewhat unsteady, showing a gait with an incoordination and mild motor weakness. Left leg was weaker than the right. She states that "the left leg gives way at the hip." Individual tests showed a fair amount of power and movements at hips, knees and ankles, right side being slightly stronger than the left. All deep reflexes were present, right patellar being slightly more pronounced than the left. The Achilles were equal and normal. There were no Babinski or Oppenheim phenomena. For a few days both had been present, the latter disappearing some days earlier. It was interesting to observe from day to day the slow evolution and disappearance of the Babinski phenomenon. The sense of position was fair at the hips and right knee, and impaired at the left knee. A greater amount of impairment was present at the ankles and toes, and rather poorer on the left side where there were 30 per cent. incorrect replies. Deep pressure sense was obtunded slightly in the lower extremities. The tuning fork vibration sense was normal at the right malleoli, feeble at the left malleoli and knees. It was absent at the pelvic prominences and sacrum. Tactile sense showed the same superior line dividing the normal from abnormal, but much more difficult to determine. It was about normal for the right leg and for the left showed a slight obtunding. Pin-pricks corresponded to the tactile sense. She volunteered "it hurts in the right leg," where as before the operation it did not. The trophic state was improving. The buttocks, which formerly "felt like sitting on ice," were much better. The lower extremities did not feel so cold. The skin, which formerly was harsh and dry, was now capable of sweating and felt moist.

Fourth Examination.—After being home one month, the patient returned for a brief examination on June 27, 1913. She stated that there had been a continuous improvement in every way. No pain or compression symptoms were being experienced. The urinary functions were normal. She walked rapidly without any support. The gait was not yet quite normal. She readily stood raised on the toes of both feet but not on those of one foot alone. The Achilles reflexes were equal and normal. The patellars were almost normal, the left being slightly brisker than the right. There were no Babinski or Oppenheim phenomena. There remained a little disturbance of sense of position for the ankle and toes, giving about 15 per cent. erroneous replies. All forms of sensation had returned almost to the normal state. Deep sensibility was normal everywhere. There was a mild diminution for epicritic and protopathic sensibility in the left leg, being normal over the abdomen and in the right leg.

No subsequent examinations were made, but reports by letters indicate that the patient was getting along nicely, the last report coming a few weeks ago. She was employed in her household duties. Some subjective symptoms were recited which might be attributed to the climacterium, which is being experienced now.

LITERATURE

While we are delving into past writings bearing on this subject there should be borne in mind the numerous possible errors, as reported cysts which are really nothing more than an excess of cerebrospinal fluid in the subarachnoidean space, cysts extending from within the cord or from without caused by some other disease, or the cystic degenerations of tumors of the leptomeninges. All of the earliest cases coming to our attention under captions of "Arachnoid Cysts," "Cysts from the Cavity of the Arachnoid," etc., are complications in which there is greatly increased cerebrospinal fluid in the subarachnoidean cavity secondary to cerebrospinal syphilis, paresis, tuberculosis and numerous other pathologic states. I name a few of those which I have analyzed as follows: Quain,[1] 1855; Ware,[2] 1858; Calmeil,[3] 1858; Wilks,[4] 1865; Sutherland,[5] 1871; Browne,[6] 1875.

Bellencontre[7] has furnished us with an early worthy contribution bearing on the subject under consideration. Most of his cases were cysticercus or echinococcus cysts. One, however, might have been a true single primary cyst belonging to our group. This one is a cyst of Professor Charcot, also reported in his work.[8] It was described as a "hydatid cyst" between the layers of the visceral arachnoid and pia in the cervical region, producing compression symptoms.

A few cases of cystic degeneration of genuine neoplasms of the inner meninges are on record. The Leyden case reported by Lenz[9] was examined pathologically by Recklinghausen and a diagnosis of "cystic sarcoma of the arachnoid with internal hemorrhage" was made. There were two cystic cavities in the tumor resting between the arachnoid layers and pia. It contained spindle cells and large ganglion-like cells. The case of Taube[10] is a lymphangioma with cystic degeneration. The origin was from the pial layers. The case of Potts[11] which was demonstrated at opera-

1. Quain: Large Cyst from the Cavity of the Arachnoid, Tr. Path. Soc., London, 1855, vi, 8.
2. Ware, C. E.: Cysts from the Cavity of the Arachnoid, Boston Med. and Surg. Jour., 1858-9, lix, 259.
3. Calmeil: Deux observations des kystes de la grande cavité de l'arachnoide, Gaz. d. hôp., 1859, xxxii, 514.
4. Wilks: Cyst in the Cavity of the Arachnoid, Tr. Path. Soc., London, 1865, xvi, 6.
5. Sutherland, H.: Arachnoid Cysts, West Riding Lunatic Asylum Rep., London, 1871, i, 218.
6. Browne: Arachnoid Cysts, Jour. Psych. Med., London, 1875, n. s., i, 167.
7. Bellencontre, P. E. D.: Contribution à l'étude des kystes hydatiques comprimant la moelle épinière, Paris, 1876.
8. Charcot: Lectures sur les maladies du système nerveux, Paris, 1873.
9. Lenz, G.: Beitrag zur Kenntnis der Tumoren der Pia und Arachnoidea spinalis und des Ruckenmarks, Bern, 1895.
10. Taube, J. L.: Lymphangiom der Pia Spinalis; Druckmyelitis, Neurol. Centralbl., 1887, vi, 247.
11. Potts, C. S.: Intradural Cysts of Spinal Meninges Removed by Operation, Jour. Nerv. and Mental Dis., 1910, xxxvii, 621.

tion had a pathologic diagnosis of a softening or hemorrhagic cyst of the inner meninges. It contained a soft gelatinous mass and lay posteriorly over the first lumbar, twelfth and eleventh dorsal segments. It does not belong to this group of simple cysts.

H. Schlesinger[12] has been quoted in a discussion of this subject. He has covered his material in an elegant and thorough manner. The two cases which he has been given the credit of describing as simple cysts of the inner meninges, however, are not clearly cysts of this class. He discusses a number of parasitic cysts.

Oppenheim[13] writes of a local arachnitis above a tumor. The two cases which he has placed on record are questioned even by the author. He considers the possibility of some neighboring tuberculous disease.

Under "Chronic Spinal Meningitis," Horsley[14] has described a condition with allusions to twenty operative cases. Only one of these reported cases is to be considered as a possible simple arachnoidean cyst. Gowers referred this paraplegic for a laminectomy. A recovery followed.

F. Krause[15] in his surgical text uses the term "arachnitis adhaesiva circumscripta," and quotes to some length the historical details of two of Oppenheim's cases. There is a question about the simplicity of both cases, Krause believing the cord changes of at least one to be secondary to compression from the arachnoidean accumulation of fluid.

While Munro[16] reports having seen the pathologic process a number of times, it is necessary to reject his reported cases. They are not true arachnoidean cysts.

The French literature contains almost nothing relating to the subject. I have had recently some personal conversations on arachnoidean cysts with neurological men in Paris. They informed me that primary cysts of the arachnoid probably are encountered in other countries but not in France.

In reviewing the case of Claude and Rose,[17] it has occurred to my mind that possibly they were dealing with a cyst of the inner meninges, either a complete one or a well-defined pouch.

Of the few undoubted cases of arachnoidean cysts available in the literature, that of Spiller, Musser and Martin[18] holds an eminent position. It is the first concise, definite presentation of the subject. The distribution of the pain rather than motor or sensory changes led to a laminectomy exposing the third and fourth lumbar segments. A very thin-walled cyst of the arachnoid was opened. A gradual improvement covering months ensued. A report[19] six and a half years later indicates an almost perfect recovery, some slight buttock pains remaining.

Mendel and Adler[20] report one undoubted case with an operation. Eight months following the operation the patient was able to walk, though he had not been able to stand on his feet before the treatment. There remained only a slight weakness of the right leg. The arachnoidean cyst was located at the upper dorsal segments.

The case of Bliss,[21] diagnosed as a pia-arachnoid cyst and demonstrated by a laminectomy, seems definitely to have been an arachnoidean cyst with fluid like the cerebrospinal. It compressed the lower cervical segments. Seven weeks following the operation there was in progress a steady return from the paraplegic state to the normal.

Bruns[22] has placed on record a certain case. By the highest zone of sensory disturbance, reaching to the sixth dorsal segment on the right and seventh on the left, the lesion was located beneath the fourth dorsal spine. A typical arachnoidean cyst was exposed by a laminectomy at the third, fourth and fifth dorsal vertebrae. The paraplegic state grew worse for two months, which was followed by a period of improvement sufficient to permit walking in nine months.

To recapitulate then, we have but four previously reported cases that might be classed with absolute certainty as primary, simple, uncomplicated cases of leptomeningeal cysts. With my two added cases there is a total of six, and all have been located in the arachnoid.

PATHOLOGY

To appreciate fully the mode of formation of these cord arachnoidean cysts, the neomembranes, and their relationship to important structures, it is first necessary to have a clear idea of the normal gross anatomy and histology of the three coverings of the spinal cord with their relationship to the spaces and cord itself.

Beneath the heavy fibrous dura is the subdural space containing only a minute quantity of fluid. The inner surface of the dura has an endothelial lining. Going toward the cord there follows a thin, delicate arachnoid. This membrane has on the parietal and visceral surfaces an endothelial lining. These delicate cells have various forms, but chiefly ovoid, and all have the same kind of nuclei. Between the endothelial layers are the fine and some coarser connective tissue fibrils. The fibers never form bundles. Mattauschek[23] has demonstrated delicate "epithelial" cells on some of the fibers. Obersteiner[24] teaches that in the normal state the arachnoid is cloudy only in extremely old individuals. The subarachnoidean space is the container for the circulating cerebrospinal fluid. Some fibers are stretched across this space, attached from the inner arachnoid to the outer pia mater. There are no nerves or blood vessels in the arachnoid. The pia, adapting itself closely to the cord and its indentures, has an abundance of vessels and nerves.

Key and Retzius[25] have furnished us with some early information on the anatomy of the leptomeninges. Brunet[26] with C. Robin has commented on neomembranes forming in the arachnoid, giving hemorrhages as the cause. Knox[27] furnished a very early argumentative discourse, criticizing Magendie,

12. Schlesinger, H.: Rückenmarks- und Wirbeltumoren, Vienna, 1898.
13. Oppenheim, H.: Geschwülste in Bereich des Centralen Nervensystems, Berlin, 1907.
14. Horsley: Chronic Spinal Meningitis, Brit. Med. Jour., Feb. 27, 1909.
15. Krause, F.: Chirurgie d. Gehirns und Rückenmarks, Berlin, 1911, ii, 726 and 729.
16. Munro: Circumscribed Serous Meningitis of the Cord, Surg., Gynec. and Obst., March, 1910, p. 235.
17. Claude, H., and Rose, F.: Kompressionssymptome am Rückenmark bei einer Hysterischen, Neurol. Centralbl., 1908, xxvii, 889.
18. Spiller, Musser and Martin: Cysts of the Spinal Cord, Univ. Penn. Med. Bull., March and April, 1903, pp. 27 and 56.
19. Spiller: Am. Jour. Med. Sc., January, 1909, p. 95.
20. Mendel and Adler: Zur Kenntnis der Meningitis serosa spinalis, Berl. klin. Wchnschr., 1908, xlv, 1596.
21. Bliss, M. A.: Cysts of the Spinal Canal, THE JOURNAL A. M. A., March 13, 1909, p. 883.
22. Bruns, L.: Ein Fall von arachnoidaler Zystenbildung, Neurol. Centralbl., Leipzig, 1911, xxx, 1026.
23. Mattauschek, Emil: Ein Beitrag zur Kenntnis der Arachnoidea spinalis, Arb. a. d. Neurol. Inst. d. Wiener Univ., 1908, xvii, 150.
24. Obersteiner: Nervosen Centralorgane, Ed. 4, Vienna.
25. Key und Retzius: Studien in der Anatomie des Nervensystems, Stockholm, 1875, i.
26. Brunet, D.: Recherches sur les néomembranes et les kystes de l'arachnoide, Paris, 1859.
27. Knox, Robert: Some Remarks on the Structure and Arrangement of the Spinal Arachnoid, Lond. Med. Gaz., 1843, ii, 463.

Sharpey and others. He mentions fine bands connecting arachnoid and pia. He also demonstrated a space completely encircling the cord.

The nature of the disease has prevented satisfactory studies of the pathologic anatomy in the few cases reported. The exceedingly delicate walls do not readily permit the operative excision of even a portion for microscopic preparations. No partitions of the cavity have been observed in the six cases. The contained fluid seemed to have been the same in all and not very different from cerebrospinal fluid in the free subarachnoidean space.

In the etiologic survey it is interesting to note that the six cases were all in women, and that the ages ranged from 17 to 50. A number of theories have been advanced regarding the cause. The parasites can be excluded. Horsley suggests the gonococcus as a cause, which is a possibility. The influenza bacillus might be considered. In fact, any one of a large number of infectious organisms may be the cause. Trauma is another possible factor. Likewise developmental malformations in the arachnoid should be considered seriously. I believe that there may be several provocative agents in the different cases and that from one of the irritating factors there are formed adhesions with the endothelial cells and fibers of the arachnoid. This is followed by an exudate or secretion from the delicate endothelial cells lining the fibrils or covering the interior of the cyst. Thus there is a very slow accumulation of fluid followed by the gradual development of the cord compression symptoms.

DIAGNOSIS

Time does not permit an exhaustive review of all the possible symptoms or the differential diagnosis in cysts of the leptomeninges of the cord. My two cases combined illustrate about all the symptoms observed. The diagnosis of a compression of the cord should usually be made without much difficulty by an experienced diagnostician in neurologic diseases. It is essential that we have an intimate knowledge of the minute anatomy and physiology of the spinal cord and roots. The almost exact metamerism of the spinal cord and its utilization should be of signal service in determining the location of the level of the lesion. To determine whether the lesion is intramedullary, intradural or extradural is not so easy a task. Much importance is attached to the painful symptoms. An intramedullary growth or cyst gives no pain unless indirectly pressing on roots. A carefully prepared sensory chart is absolutely essential, and is the chief guide to the segmental localization. The reflexes are of some importance for locating the lesion. A chronologic review of the development of the motor weakness and the various painful neural phenomena is of much importance in determining whether the pressing object is a hard, soft or cystic one. Variability in the degree of some of the symptoms, especially pain, sensory disturbances and motor weakness, is characteristic of an extramedullary cystic compression.

Rachiocentesis is advised in all these cases. It aids in establishing the nature of the trouble. Gendron[28] suggests a puncture above and below (*au-dessus et au-dessous*) the compression for separate chemical and microscopic examinations, as has been done by Sicard and Foix in a series of cord compressions from Pott's disease.

28. Gendron, André: Étude clinique des tumeurs de la moelle et des méninges spinales, Paris, 1913, No. 229.

TREATMENT

More than a quarter of a century has elapsed since the first successful removal of a meningeal tumor compressing the cord was accomplished by the late Sir William Gowers[29] and Horsley. To-day the spinal canal is so frequently opened that it is unnecessary to say anything regarding the comparative safety with which these major operations may be performed.

Laminectomy is the only treatment for cysts of the cord arachnoid and pia. It is usually necessary to remove at least three laminae. The leptomeningeal cysts have been found chiefly in the dorsal vertebral canal. No postoperative drainage is necessary. No physical or chemical therapeutics are considered for the eradication of the disease. If there has been much motor impairment, however, it might be of considerable benefit to give massage and electrical treatments to the paraplegic regions during a certain period following the operation. The prognosis is excellent if proper treatment is given early. There should be in the neighborhood of a 100 per cent. recovery rate if an early operation is performed. Comparing my two cases illustrates this fact. The compression may continue to a degree at which the pyramidal tracts have degenerated beyond repair, and a restoration of the paraplegic state becomes impossible. My second patient had visited a famous surgical clinic a week or two before coming under my observation, was observed ten days and with grave doubts about the diagnosis sent home with the advice to return in three months for further observation after the disease had advanced further. A skilled neurologist should have recognized the condition at a stage fully as early as the patient presented herself.

CONCLUSIONS

1. Admitting, from results of a thorough search of the literature, that there have been recognized only a very few cases of simple, uncomplicated cysts of the spinal arachnoid and pia, we should keep, nevertheless, a lookout for others. The recognition of some of these cysts may have been neglected in the past.

2. The diagnosis of a lesion at or near a certain segmental level should not be difficult. The perception of the exact nature of the compressing material is accomplished less readily.

3. A prompt evacuation of the cystic contents by means of a laminectomy should permit a good prognosis to be fulfilled.

NOTE.—Since the preparation of this article there has appeared the careful report of another case of arachnoidean cyst by Bouché (Compression medullaire par arachnoidite cloisonnée, Revue Neurologique, July 30, 1914, No. 14), the publication being delayed almost one year owing to the bellicose times. The several severely damaged functions had returned almost to the normal twelve months after evacuating the cyst by a laminectomy. The author comments on the dark etiology and the importance of early operative intervention.

Rialto Building.

29. Gowers: Diseases of the Nervous System, Ed. 3, i, p. 627; Med. Chir. Tr., 1888, lxxi.

Heavy Athletics.—The college strong man often dies in middle life. The long-distance runner, the great-chested rower, the prize fighter, usually dies young, frequently from tuberculosis or some other disease associated with lowered resistance. Heavy athletics are pernicious. They have no place in hygienic exercise. The after effects of severe exertion are harmful. An enlarged heart is not a safe organ; a greatly increased lung capacity is not only useless but dangerous in later life.—*Public Health Reports*, May 7, 1915.

THE INTELLIGENCE EXAMINATION AND EVALUATION

AND A NEW INTELLIGENCE EXAMINATION SHEET

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The examination and evaluation of a child's intelligence is a most difficult procedure. No method of absolute computation of the *normal* general mental ability exists, not even a relative computation, and, at best, our conclusions are based on single facts which we ascertain. In other words, we estimate the whole by gaging a separate part[1] or, better still, several separate parts.[2] How accurately, it must be asked, can this be done? About as accurately as anything, perhaps, that is in largest measure subjective. Using precisely the same methods, my results and yours may evidence remarkable divergencies. Much will depend on one's knowledge[3] of the *normal* and *abnormal* child, and more still on wide experience in examining and treating such.

But there is not even an absolute *normal*. The pendulum of intelligence may swing a minor length to right or left and still be within accepted bounds. A relative evaluation of the intellectual make-up, therefore, may be sufficient for our purposes. Our purposes? Just what may they be? Briefly this: The individual we term mentally and intellectually normal is one who acts and *progresses* in a manner that will permit him to take his place among his fellows without conflict, or any hindrance or molestation to them. Or again, to state it differently, normal is one whose reaction to given stimuli is no more nor less in degree and manner than a certain quantum that we have become accustomed to—allowing the foregoing latitude for the pendulum swing, and remembering the possibilities of topographic, racial and temperamental variations. Hence, as clinical psychologists, confining ourselves for the time being to the problem of the child, we have children brought to us because they "do not keep up with the others in the class," because they "fall behind," or "do not progress," etc.; or the complaint is that they "cannot get along with other children," or are odd or just "queer" or "peculiar" or "not right"; or they are children "who cannot be managed or trained," who "are combative, destructive, morbidly tempered"; who "run away," or "come in conflict with the law," etc. Some may be ignorant; some not at all. Their variance from the *action* and *progress* that we have become inured to causes these children to be singled out by their own families in the home, or by the teacher in the school, or by the police (or probation) officer in the community at large; and they are then (or ought to be!) brought to us for a diagnosis and prognosis preliminary to a therapy. This, our first purpose and duty, then, is to discover in what and why such a child differs from the mentally normal child.

The *why* here referred to, that is, the etiology, I do not mean to touch on in this paper. As to the abnormalities involved, they are those of mental and actual behavior which we rubric under the general term of psychopathies (and these, too, I shall leave aside for the present[4]) and those involving the intelligence as such. The latter necessitate our acquaintance with the component parts of intelligence and their normal interfunctioning in the mental process. They also necessitate our acquaintance with the methods of testing these faculties. It is this examination which, as I have intimated, is so difficult, and for which no simple or sufficient method of procedure has yet been offered. How shall we probe the psychical make-up of the child so that its general mental endowment may be understood, may be (for purposes of record and accuracy) graphically expressed—evaluated, as we are wont to say? How further shall we analyze the whole so as to discern the parts, the separate so-called faculties, and thus gain insight into this facultative interfunctioning and finally appreciate the nature of its thinking, feeling, judging, acts of will?[5] For the mind, the psyche, the general intelligence of the child, call it what you will, is not a matter of what it knows or has retained—not a matter of knowledge—but of something essentially dynamic behind and veritably *in* this knowledge, in short, a facultative interfunctioning (of perception, comprehension, combination, etc.), harmonious and correlated in the normal,[6] discordanced and disrelated in the psychopathic, incapable, inadequate, impotent when there is intellectual defect.

From this it may be seen that the work in clinical psychology is far different, and a decidedly more serious business than that of "testing whether one is an idiot, imbecile or moron," a stereotyped jargon heard on all sides at present, for the entire matter has fallen on evil days and into the hands of a new class of dilettanti who have been permitted to invade the clinics and colleges, and who believe they know aught of the child because they have learned to make a Binet test. It is the latter fact, and the proneness of our institutions likewise to lean to passing fashions, that makes it most imperative for us to indicate just what the Binet tests do *not* do, and their general

1. Thus, some have graded intelligence by tests of color sense alone, or through tests of sensory acuity (with esthesiometer) or through a completion (Ebbinghaus) test, etc.

2. Nor do we deceive ourselves in thinking that the intelligence we are testing is just the sum of such "parts." Intelligence depends on their correlation and interfunctioning.

3. By which I mean pediatrics and neurology, and a considerable knowledge of some of the specialties and much beside. A clinical psychologist must be first and foremost a physician; everything else is secondary. That the physician today knows nothing of the subject is pathetic enough, but does not change the matter. The psychologist and psychology must, in clinical psychology, be subservient to the physician. Knowledge of physiology and its pathology is the fundamental, and deep and abstrusely in this physiologic are hid the roots of mental functioning, both normal and abnormal. Out of the anamnesis and the examination we ascertain more important facts for the understanding and evaluation of the child mentally than out of the psychologic tests, however indispensable the latter may be. They must never be held as substitutes for medical facts, but merely as concomitant data to such ascertained through medical and psychopathologic examination. It is more important to learn that a child's mental "peculiarity" or abnormality is due to disturbance of internal secretion (mental infantilism, for instance) or nasal occlusion or ethmoid disease (as Aprosexia nasalis) or latent congenital lues (mental defatigation, etc.), much more important, for the understanding of the case, than to learn from tests that its attention, concentration, etc., are defective.

4. It must not be forgotten, however, that the intellectual functioning may be much influenced or disturbed by the psychopathy of an individual. At our clinic a psychopathy questionnaire is, therefore, always filled out before the intelligence examination is begun.

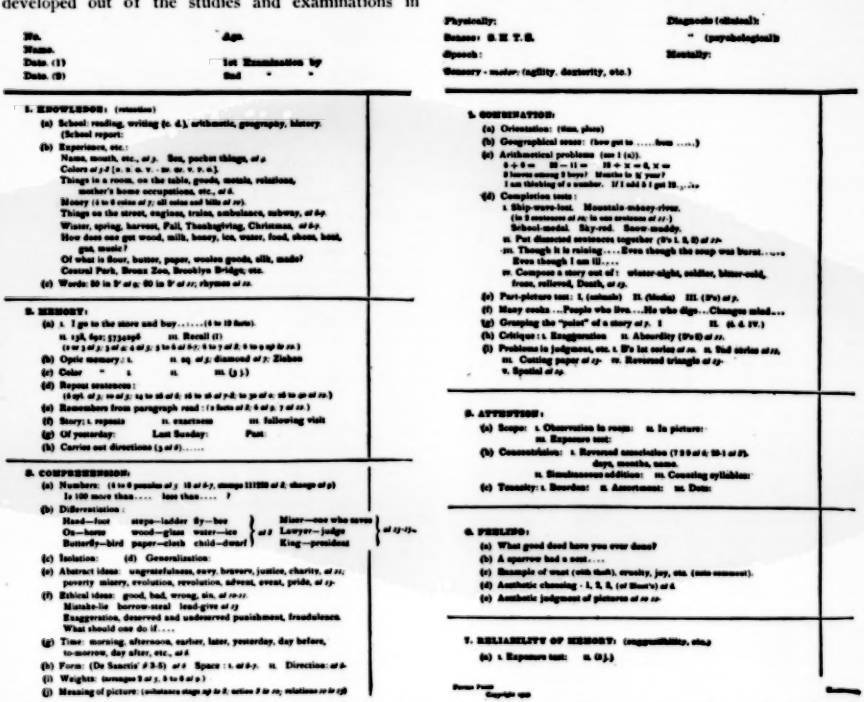
5. Another very important factor is diligence or assiduousness. It plays the greatest part in the mental building of the child and later on through life. There is, however, probably no way known of examining or estimating it.

6. There is, however, an abnormal type in which the mental functioning may be harmonious and correlated yet of an abnormal nature, inasmuch as the scope of such functioning is miniature, or infantile. It is an important class, even if a small one, to keep in mind; it is no doubt most often overlooked. Of course, some of these cases of psychic infantilism may also be below the normal in intelligence, or even defective. See Anton, G.: Ueber Geistigen Infantilismus, in Vier Vortrage über Entwicklungsstörungen beim Kinde, Berlin, 1908; especially pp. 35-36; also De Sanctis: Gli Infantilismi, Policlinico (sezione pratica), Rome, 1910, p. 20.

limitations, and warn, as Stern,[7] Bobertag, H. Myers and Binet himself warned, against dilettanteism in this work, and the use of any test series in an automatic way.

There are two methods of examining the intelligence now available, the one being the testing of the "faculties" on which intelligence is assumed to rest, the other a reconnaissance of a set of facts stated to be known by a large percentage (75 per cent.) of children at each given age (namely, the Binet tests).

The former tests are those longest in use, and developed out of the studies and examinations in



Outlines of tests used in determining the relative intelligence of children. Copies of this sheet may be obtained from the Fetzer Press, 106 Duane Street, New York.

psychiatry and the domain of the mentally abnormal. Large series of psychologic tests were made on normals and abnormals and the differences noted. Both tests of single psychologic factors were devised and then entire series of tests (Rieger, Kraepelin, Anton, Sommer and especially Ziehen), and so psychology came to the aid of mental pathology (psychopathology), and both were commissioned by pedagogics and its deviate, remedial pedagogy (Heilpaedagogik). Hence the many sources of these tests, and also their wide field of application.

As to the faculties to be tested in this sifting of the mental, they are primarily such as are involved in what one deems *intelligence*—primarily but not exclusively so. Ziehen[8] characterizes this intelligence as essentially composed of memory, comprehension and judgment or combinational ability. Stern[9] holds it to be "the general ability or capacity of an individual consciously to focus his thinking on new requirements; it is general mental adaptability to new problems and conditions of life." But this depends wholly on the factors designated by Ziehen. Still another definition is attempted by Treves and Saffiotti.[10] "Intelligence," they write, "consists in the greater or lesser ability of an individual to utilize the theoretical and practical worth of his ideas and acts in orienting and adapting himself to his environment, by discerning (or finding out) that which is most advantageous for him." This, however, does not tell us with what psychologic functions it is accomplished, and we must again fall back on the elements noted in the first definition.

7. Deutscher Kongress für Jugendbildung und Jugendkunde at Dresden, 1911. Report in Arbeiten des Bundes für Schulreform, etc., Leipzig, Teubner, 1912.

8. Ziehen, T.: Die Erkennung des Schwachsinns im Kindesalter, Berlin, Karger, 1909, p. 1.

9. Stern, W.: Intelligenzprüfung, Leipzig, 1912, p. 3.

10. Treves and Saffiotti: La scala metrica dell'Intelligenza di Binet e Simon, Milan, 1910, 1911. A still somewhat different interpretation is given by H. Kahane (Grundzüge der Psychologie, etc., Wiesbaden, Bergmann, 1914, p. 186): Insoferne die Psyche wahrnimmt und Wahrnehmungen einordnet um aus ihnen ein ebens festes als elastisches system zu schaffen, das allen Beanspruchungen genügen soll, spricht man vom Walten des Intellekts und mutet jedem Individuum und jeder Entwickelungsstufe einen gewissen Grad von Intelligenz zu.

Thus, for examination, we single out memory and retention (which includes reproduction or recalling), comprehension, combinational ability, and such influencing components as attention, feeling and reliability of memory. (Ziehen,[11] to quote him accurately, tests retention, development of comprehension [Vorstellungsentwicklung] and differentiation of ideas [Vorstellungsdifferenzierung], which includes isolation, complexion and generalization; reproduction, combination, feeling and attention. At our clinic we at first followed in these footsteps, but later altered the arrangement, and adopted a somewhat different routine. Sommer, on the other hand, tests memory, school knowledge, arithmetic, association and its relation to "understanding," attention, comprehension [Auffassungsfähigkeit] of complex ideas, mechanical or practical and constructive understanding or ability, logical relations, intellectual interest, and comprehension of the environment.[12]) We ascertain whether the child is normal, backward or defective in these, that is, in all, or again possibly only in one. Even in the normal these faculties are not on the same even level—a point of no little importance to remember. We shall be able likewise to understand an abnormally limited store of knowledge if we find memory defective — the poor memory making *retention* impossible; or the memory itself may not be at fault, but the weakness lie with the attention. If a child's attention is nil, or nearly so, then its perceptive process does not focus long enough to produce the cortical alteration giving memory. Thus we get our clue to the interfunctioning and interdependence of the various faculties.

Bearing these facts in mind, let us turn to the second method of examination, namely the Binet-Simon evaluation according to age norms, and inquire whether by their very nature these tests are able to fulfil the foregoing requirements, and give us the necessary data, and in fact, what is assumed to be their specific merit, the norm of such data at a given age.

If one looks over the fifty-six queries allotted in groups averaging from four to six for each year in the most recent scale, one is struck first of all by the paucity of questions, and is prompted to doubt the possibility of gaging the mentality of an individual, or rather his intellectual age with four or five bare questions! One also notices that these questions are in large measure questions of language efficiency[13] and of school-trained facts.

Now, the child with whose quota of intelligence the clinical psychologist is in largest measure concerned is the so-called *psychopathic constitution*,[14] and the study of just these cases by Ziehen at the Berlin Charité, and later by his assistant Stelzner[15] proved that these children, in spite of normal intelligence, were defective in school-trained ability. The same was pointed out by F. Kramer in connection with the examination of psychopathic and criminal children.[16] These may cut school so often, or raise trouble so constantly in the class room, and be so untameable through punishment or discipline that they are "left back" again and again; and so they may be low in school knowledge, and yet of good intelligence.

Looking again at these groups of questions, and checking them off individually, one finds that the functions tested in each year are by no means the same, nor are they systematically arranged, so that in testing the next higher year one may be testing quite a different set of functions, and one, therefore, could not at all say that one child passes a year in advance of another, for one has not examined the same faculties. This fact Meumann[17] points out to be one of the greatest drawbacks of the Binet tests.

But even if all the faculties were tested in each year-group, could one then average up the whole, and assay a mean valuation as an age-norm? To this Seashore[18] made objection, pointing out that retardation does not follow a common flat level any more than growth does, and that a child could be at the mental age of 6 in one capacity and 12 in another.

Another set of serious shortcomings in these tests become evident if one glances over the questions used by those testing out the Binet series (Goddard, Terman and Childs, Bobertag, Meumann, and others.) One finds some questions pronounced too difficult, some too easy. They are then placed in a lower or higher year-group according to the inclination of the tester; but in a set of four or five questions such a single question plays no small part in the final evaluation, and the results would read quite differently according to which "scale" or whose "modification" was being employed. Must we not wait with the application of these tests, then, until we determine in just what year-group the doubtful questions belong? But a still more remarkable fact has been brought to light: applying the Paris scale to the children of Rome,[19] of Brussels[20] and of Moscow,[21] one found that the children of the first two cities tested at least two years higher than the Paris schoolchildren, while those at Moscow tested at least two years lower! Does this mean that the Parisians are mentally retarded compared with the Romans, or that the Moscowitz are defective according to the Roman or Brussels scale? If nothing else, it indicates[22] that the Binet tests are milieu or community tests, and that there is no such thing as a general normal age-average of intelligence. But how allow for these variations in testing children of our own mixed population? Shall we apply a different scale of reckoning when testing the Italian child or the Russian? Are there general differences in the races, or is the difference environmental, or pedagogic?

Nor do the Binet tests, nor can they, take into account obtaining *abnormalities*. Hence, as I pointed

11. Ziehen: Die Prinzipien und Methoden der Intelligenzprüfung, Karger, Berlin, 1908 (after the address at Intern. Kongress, Amsterdam, 1907).

12. Sommer: Klinik f. psych. und nervöse Krankheiten, 1911, vi, 222. See also his Lehrbuch der Psychopathologischen Untersuchungsmethoden.

13. See, for instance, in this connection the criticism of L. P. Ayres (Psych. Clin., 1911, v), and of Mehnert (Dresden) at the Dresden Congress, October, 1911. The latter criticism will be discussed farther on.

14. Ziehen: Die Erkennung der psychopathischen Konstitutionen, etc., Berlin, Karger, 1912. Haberman, J. V.: The Psychopathic Constitution, Med. Rev. of Rev., March, 1912, and literature there cited.

15. Stelzner, H.: Die Psychopathischen Konstitutionen, Berlin, Karger, 1911, pp. 72 et seq., and especially p. 91.

16. Kramer, F.: Intelligenzprüfungen bei psychopathischen und kriminellen Kindern," Deutsche Kongress für Jugendbildung und Jugendkunde, Dresden, 1911. Congress Report by Teubner, Leipzig, 1912, p. 23.

17. Meumann: Vorlesungen zur Einführung in die Experimentelle Pädagogik, ii, pp. 278-279. He also states that the questions are not tests *of intelligence*, but of quite various things, some being purely psychologic [of psychologic functions] some of knowledge, the latter again partly such as the child learns from those around him [picked up at home or on the street or at school], partly gains through his own observation. All the latter do not test his ability as such, but only the influence of "milieu" on his ability, etc. Then there are tests of functions and knowledge mixed [as the language tests], etc.

18. Seashore, C. E.: The Binet-Simon Tests, Jour. Ed. Psychol., 1912, iii. Aikens, Thorndike and Hubbel: Correlation Among Perception and Association Processes, Psychol. Rev., 1902, ix. Wissler, C.: Psychol. Rev., Monog. Supplement III, 1901.

19. Jeromutti, A.: Applicatione della Scala metrica dell'intelligenza di Binet e Simon etc., Rivista Pedagogica, 1909. Cited by Meumann, ii, 249.

20. Decroly and Degand: La measure de l'intelligence chez des enfants normaux, Arch. d. Psychol., 1910, ix.

21. Schubert, Anna: Vortrag auf dem ersten Russ. Kongress f. exper. Pädagog., 1910. Cited by Meumann, ii, 251.

22. Meumann: Vorlesungen, etc., ii, 281-282.

out some years ago,[23] they have little or no value in the evaluation of abnormal children if taken alone, not disclosing the *patho*psychologic aberrance characterizing such mental make-up. And to the psychopathologist or clinical psychologist the fact of importance is not whether the child is at his age norm of intelligence, but rather, if deficient, the nature of such deficiency, and the why and wherefore of it. Abnormalities of attention may alone in the psychopathic throw an entire series of tests and computations out of gear. But one must also remember that vascillating or dispersive attention, or utter inability to attend or concentrate, or, again, hyperfantasy or day-dreaming tendencies or pathologic moods and perverse humors may all make great incursions on such children's perseverance, and so increase the difficulty to pursue systematized work, whether in school or out. Concerted with this is the additional fact that their erethism and shifting fancies, and often enough a dromomanic bent — their wanderlust — impels them to truancy half the time, or carries their interests forever "wool-gathering" and far from their work.

Some of these children show, especially, ethical defect and are peculiarly unmanageable in school. They pass as "bad children," are constantly up to mischief, and cannot be reached through punishment of any kind. Of course, they won't "study" or do "homework," and are in consequence repeatedly left back. But their intelligence is not defective, not even retarded; they are sometimes even remarkably intelligent. Some of these children in later life may show great talents along certain lines, and become personalities of no little renown. Very great indeed is the difficulty of diagnosis when there is just a mild intelligence defect, combined with such psychic abnormality. These children only too often are the class from which our chronic criminals spring.

Still another type of abnormality ought to be borne in mind because it is important and so frequent, and yet never mentioned in connection with clinical psychology, and I fear rarely thought of by neurologists or pediatricians in treating their young charges. It is a kind of emotionalism or affectivity in certain children, children often finely attuned and "soulful"—but present likewise in the ordinary psychopaths of the "affective type"—which breaks forth on slight provocation and then clings in a singular way. Like a mist, depression and oppression, despondency or sadness permeates their minds and clouds their thinking and hangs on their actions like a weight of lead. This mood *irradiates*[24] to current thoughts and happenings and unrelated things, and sometimes even follows on into the years.[25] This mood may be morbidly indulged as in the Byronic way—"the stinging of a heart the world has stung"—or may recur in spite of every counter effort. It is at its worst when fear comes in its train. One finds it as the occasional occurrenece in some normal children, or as a disposition or proneness to disposition in certain abnormal ones. It is found especially frequent in the children of neurasthenics or in children themselves neurasthenic. Its effect on intelligence may be but to color it—or again, and this is the important thing, it may occasion inhibition, at times so intense as to be decidedly baneful.[26] That these facts (of feeling, emotion, will, etc.) have all been neglected in intelligence computations, and are especially neglected in the Binet tests, Meumann[27] justly points out.

Are these abnormals or psychopathic constitutions (Ziehen) unusual cases, so that the objection may be made that regarding the work in clinical psychology we are unduly emphasizing a minor factor? Indeed no; for these are the preponderant cases among those we see, these psychopathic constitutions, and *not* the "idiots, imbeciles and morons"! And Binet testing brings out none of their abnormalities, and may put the falsest evaluation on their mental ability. Herein lies the most important shortcoming, to my mind, of the Binet tests.

Finally, the danger of pronouncing an opinion on one examination has been pointed out (Graupner[28]) remembering the extensive fluctuations in mental accomplishment under normal conditions, varying fatigue, alimentary hazards, dysphorea, disinterest, disinclination, disconcertedness, etc. Even at different seasons of the year, teachers will tell you that the ability of children varies considerably. Underfeeding, anemia, tuberculosis and other bodily conditions may also strongly inhibit the mental functions for the time being, and so lead to incorrect conclusions.[29]

The objections to the Binet-Simon tests thus far enumerated will suffice to indicate, I believe, that whatsoever the practical value and promise of these tests for rapid orientation of large numbers of children, mass evaluations, so to speak, they cannot in their present form be automatically applied, and can scarcely be regarded as anywhere nearly safe or certain tests of intelligence in the *individual normal* child. And in the case of the *abnormal* child, the psychopathic constitution, these tests become for the most part utterly impossible and valueless. Even when made in such cases in connection with other examinations (our "psychopathy sheet" and neurologic examination) it is only of interest, scarcely of importance. That an appraisal of quality, apart from quantity, in such tests depends mostly on the opinion (subjectivity) of the examiner, is evident. And that little of the separate intellectual components or characteristics is brought out is likewise evident.

These tests, however, do not claim such a purpose, it may justly be answered; they assume to be specifically tests of the *general* ability. Very true; but are they really so? Can they give an accurate *equation?*

23. Haberman, J. V.: Intelligence Tests, Med. Rev. of Rev., August, 1912.

24. Ziehen: Leitfaden der physiologische Psychologie, Ed. 7, pp. 161 and 258.

25. For a remarkable example see De Quincey's autobiography, The Affliction of Childhood, and the Dream-Echoes Fifty Years Later. It may be of interest to state that types of these "affective" natures are found often enough in literary and musical biography (our Poe for instance, or Baudelaire, Lennau, Beethoven, Chatterton, or Ernest Dowson) and autobiography (the best example probably being De Quincey). Such children are also often enough those written of in story, Pater's most exquisite Child in the House, for instance (which probably is autobiographical), and some of his Imaginary Portraits. They are the "Werthers" in an entire period of German "storm and stress" romanticism, as also the children in many of the English Victorian novels (especially Dickens and Bulwer). But how many just such among the "mute inglorious" real sensitive children we see but rarely stop to understand! Does one ever stay to think of what goes on in the mental life of those many children who commit suicide early, and the many more who later travel the downward path to moroseness, to crime, to despair and insanity! Here is the real work for the future clinical psychologist, to find out these children, and "feel out" their "soul's pathology," and help them over their affectivity into healthy modes of thought.

26. Meumann: Vorlesungen, etc., ii, 459 et seq.; i, 641. See also Th. Heller's über affektiv bedingte Psychoneurosen des Kindesalters, Zeit. f. kinderheil., No. 2, 1913, ix.

27. Meumann: Vorlesungen, etc., ii, 464.

28. Graupner: Leipzig Congress Report, p. 40.

29. Here I might also mention the interesting point brought up by W. Hofmann at the Dresden Congress, that there may be a latent intelligence, necessitating some special stimulus to startle it into action. In this way the fact may be explained that it often comes down to us historically that men of great intelligence were not only poor at school in their youths, but also were considered on all sides as but meagerly intelligent.

We have seen that in the psychopathic they cannot. It has also been indicated[30] that a good memory may cover up a multitude of sins, and an individual pass as normal who may be defective, even feebleminded. But more important still is the question, Does such data give us adequate information? Are we, after all, any wiser? When a man sways on closing his eyes, the physician calls it a Romberg; but the good physician differentiates between a real and a pseudo-Romberg, and even goes further and sifts the cause, distinguishing the entirely psychogenic as in hysteria from the organic, as, for instance, in an alcoholic polyneuritis. Only when the data are thus separated and unraveled can a diagnosis be made. Is the matter at all different in clinical psychology? Does knowledge of the average mental performance of a child, after all, give you any insight into its intelligence or mentality?[31] Especially, if the performance is below normal, do we know aught if we do not know in what functions, and why, whether in one (and which) or in all, whether due to psychologic causes, or physiologic, or pedagogic or environmental? In short, we can form a rational conception only if we ascertain the data concerning single component functions, and construct our estimate from these.

And now, sum up, mentally, the strictures I have pronounced in criticism of the Binet tests, and then think for a moment of the amazing popularization of these tests in this country, so that at most of our mental and educational clinics they are the *only* tests or *the* tests, made in diagnosing mentally abnormal children (and made usually by examiners of such wide experience in psychopathology as young college graduates or nongraduates, without medical training whatsoever, or in fact, knowledge of psychopathology save what they probably derived in a half years' course at college "with a visit to the island"!) Like the freudian delusion, this Binet testing dilettanteism has taken us by storm, and shows splendidly our native gullibility and likewise an interesting phase of the hysterical lay-medical activity of the times.[32] It is to be deeply regretted that the universities do not rise above this undiscerning level, and institute departments for the genuine study of the abnormal child — departments composed of a medical and pedagogic contingent in connection with a psychoclinical clinic and laboratory, as well as affiliations in the departments of experimental pedagogy, pediatrics and neurology. At least that would be the ideal situation. How far we are still from this may be understood when we remember that not a medical student graduates with an iota of knowledge anent the abnormal mental in connection with the child, or an idea as to how to examine it, or spot the forerunners of impending trouble. Nor have we scientific clinics with adequately trained or skilled workers—for we would scarcely call adequately trained an oculist, for instance, who was not a physician at all, but "read up" a bit on the subject at home, and "picked up" what he could at some clinic. Yet such are the "clinical psychologists" who pass on our children — *for we have no departments where clinical psychology is scientifically taught—theory and practice, lecture and clinic.*

I have not made criticism here or elsewhere in a spirit of animadversion, but in the interest of child psychopathology[33] and remedial, pedagogics, and with the hope that the universities may wake up to the vast importance of the subject, and make an attempt to place the work on a dignified footing, and give it a propitious chance to grow.

And now to return again to our intelligence tests — the first considered facultative tests. Is it not possible, it may be asked, to arrange these so as to obviate the many objections brought up in connection with the Binet series? Yes, this appears possible; and for quite a time we have been working with such a series of tests at our clinic—a procedure at first based solely on the method of Ziehen (whose methods and teachings we have closely followed at our clinic), but little by little modified and altered. Finally, we devised a *test sheet*, rubricked for knowledge or retention, memory, comprehension, combinational ability, attention, feeling and reliability of memory. Sufficient tests were given (not just one,) and the various subfunctions examined (as, for instance, under comprehension, the comprehension of numbers, of words, of abstract ideas, ethical ideas, etc.). Thus each child at every age would be tested in these various faculties and adequately tested.

But one embarrassing question frequently came up. If a child passed various memory tests, for instance, it would be asked, does it answer questions difficult enough for its age? Or if a question was not answered, wasn't the question possibly too difficult? In other words, here was the age-norm query of Binet confronting us again.[34]

The older psychologists got around this by either calling a normal child of like age, and putting the same question or trusting to their experience as to what a child of that age ought to know. This, of course is neither safe nor scientifically accurate. Could not, then, the Binet plan be applied in some way, or to some extent, to our own sheet?

This I have attempted in the accompanying form which I offer here in the way of a preliminary report. The test series employed by Ziehen — but modified and increased in the progress of this work at our own clinic — formed the fundamental of this sheet. In it were finally incorporated some of the important questions of Binet, rubricked according to the functions involved, as well as those of Meumann and others. Binet's age norms were placed in italics, to the right of the various questions, and additional facts, assumed

30. Saenger of Hamburg (Congress report); also Trûper of Jena at same meeting.

31. This criticism has been especially made by W. H. Pyle: Suggestion for the Improvement and Extension of Mental Tests, Jour. Educat. Psychol., February, 1912. It may also be remembered that in mental pathology, disease processes involve *electively* (not generally), and in a most remarkable way. So optic memory and optic phantasy may alone be lost, or an almost isolated word deafness may occur, in which the inner word memory is alone lost). In Korsakoff's syndrome orientation and recent memory are severely involved, while early memory and the results of early thinking are relatively well preserved. The tonal feeling or ethical feeling may become dissociated from the ideas with which they were connected. Cyclic conditions, drugs and poisons are likewise elective in their mental invalidation. The degenerates often show remarkable mixtures of talent and defect, etc. (Antoh: Ueber krankhafte moralische Arbortung im kindesalter, etc. Jurist et Psych. Grenzfragen., Halle, 1910).

32. To wit, the psychopathology on the stage (Damaged Goods, Maternity, etc.), the teaching of psychopathology at nonmedical colleges, the exploitation of the psychopathologic in newspapers and magazines, and the intimate discussion of these things among laymen. What delightful advertisements, for instance, were bill-posted for Twin-Beds, and what interesting comment as to utility, etc., they evoked! In a play called Fads and Fancies, an automobile is given "twilight sleep." And at Chicago the thing in reality was to be advertised through moving pictures (The Limit in "Twilight Sleep" Sensationalism, Current Comment, THE JOURNAL A. M. A., April 10, 1915, p. 1251). Also, Haberman, J. V.: Psychic Therapy, Clinical Psychology and the Layman Invasion, Med. Rec., New York, April, 24, 1915.

33. I do not refer to psychoses, which are most uncommon in childhood, or to idiots and imbeciles—which are for the most part segregated in institutions, where only a very little can be hoped for them — but to those abnormals and psychopaths mentioned throughout these pages.

34. This, however, does not mean that the intelligence age is of importance or necessary to know in every case. We very often get along without exact knowledge of this.

to be known or answerable at a given age, were added (from the writings of Ziehen, Meumann, Gaupp Bobertag and others[35]).

The age norms must still be considered but approximate, for reasons already given, the varying normal fluctuations in intelligence, wide differences in opinions still maintained as to the difficulty or overeasiness of certain questions, the unsettled problem of possible racial or environmental variations, the differences found in children tested in higher and lower social classes, etc. There is even a possibility that the intelligence variations in individuals of the same age are greater than we assume — at least the contrary has not been proved — so that we possibly have no normal age norm of intelligence or of the faculties comprising intelligence. This, too, must be borne in mind.

So much for the present in the way of criticism of methods, etc. Elsewhere the facts making up this test sheet will be fully described and discussed, and the importance of the faculties themselves in their interfunctioning studied in relation to mental evaluations.

THE EFFECT OF POTASSIUM IODID ON THE LUETIN REACTION

PRELIMINARY REPORT *

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During the past year I have had the opportunity of studying the luetin reaction somewhat in detail on patients admitted to the neurology service of the Hospital of the University of Michigan. As a result of this study, it was attempted to determine the value of the luetin reaction in the diagnosis of syphilis, the proper technic and the influence of various factors such as medication, etc.

Observations were made sometimes repeatedly in a series of 235 cases from the neurologic clinic of the University of Michigan, service of Dr. C. D. Camp. This reaction was also tested in a series of sixteen cases admitted to the clinic for dermatology and syphilology, University of Michigan, service of Dr. Udo Wile.

The technic followed is that described by Dr. Noguchi, namely, the intradermal injection of a 1:1 dilution of luetin material with saline.

The cases were taken indiscriminately and were both luetic and nonluetic. In fact, a large percentage were nonsyphilitic from every standpoint, including cases of pernicious anemia, brain tumor, hysteria, traumatic neurosis, muscular dystrophy, sciatica, chronic nephritis, neuritis, epilepsy, exophthalmic goiter, multiple sclerosis, arteriosclerosis, disturbances of the internal secretions, etc. The reaction was observed on an average of from eight to ten days, and in many for a period of several weeks.

A detailed report of the various factors mentioned above will be deferred to a later communication. In this report I wish to call attention to the influence which potassium iodid has on the luetin reaction.

The fact that the administration of potassium iodid will cause a positive luetin reaction which otherwise would have been negative in nonsyphilitic individuals seems not to have been observed. Furthermore, the fact that this reaction is indistinguishable from the reaction indicative of syphilitic infection is a matter of considerable importance to those using the luetin reaction as a means of diagnosis. If the patient suspected of being syphilitic has received potassium iodid either before, during or shortly after the use of the test, the result is entirely unreliable. The fact that the iodids are capable of causing this reaction to the intradermal injection of luetin may throw some light on the pharmacologic action of the iodids.

Where potassium iodid is administered to patients who have undergone a luetin test, it is found that in practically every case a pustular or nodular reaction results; in this series only one has failed to respond. As a rule, relatively large doses are required to bring about this condition, on an average of from 20 to 30 grains three times daily; but a great deal apparently depends on the individual's susceptibility, a positive reaction being obtained in several cases with small doses, 10 grains three times daily. This reaction is characterized by a marked areola, with redness, edema and swelling appearing in a very few hours after the injection and gradually increasing in its manifestations. There is a firm, central nodule of a bright red color raised above the surface of the skin and extending deeply; this nodule develops an area of central necrosis which, in turn, is in most cases replaced by a hemorrhagic pustule. The intensity of the reaction varies in different individuals, but always goes on to the pustular stage if the drug is continued. This pustule, on discharging, soon heals, and marks the end of the reaction. If only small doses of potassium iodid be given, or if large doses be given for a short time, and the drug is stopped short of the pustular stage, there is a similar reaction to the iodid but no discharge, and the lesion involutes, to reappear again on subsequent readministration of the iodid. This has been demonstrated in several cases, and with proper manipulation I think can be obtained in practically every case.

It is interesting to note that the period elapsing between the injection of the luetin material and the ingestion of the potassium iodid may vary widely with still positive results. In one case with a negative luetin test, potassium iodid was given in small doses about two months later, and the old seat of the test immediately developed an areola with a firm, red, central nodule. The potassium iodid was then discontinued, and the reaction stopped short of the pustular stage and underwent complete involution. Subsequent administration of potassium iodid several weeks later resulted in a similar response. If potassium iodid is administered at the time of the injection of the luetin, an intense reaction develops in from three to eight days. A similar result ensues if the patient has been receiving potassium iodid previously, but even more quickly. If, however, the patient has received potassium iodid over a considerable period, but none previous to the luetin test, a positive luetin will still result, if too long a time has not elapsed from the time of the administration of the iodid. In one case a marked reaction was obtained three weeks after the potassium iodid was discontinued.

A reaction similar to the luetin can be obtained by the injection intradermally of other substances, such as agar, starch, etc., and the administration of potas-

35. It was astonishing enough how little an immense amount of reading brought to light and how little could be got from Binet himself in the faculties of combination, attention, feeling, etc.

* From the Neurologic Clinic, Hospital of the University of Michigan.

sium iodid. The response which agar shows to potassium iodid is more marked even than the luetin material, an intense reaction involving practically the entire surface of the arm resulting. A very thin emulsion of agar, less than 1 per cent., is injected in 0.07-c.c. doses. There is a response without potassium iodid; but this, in the course of a few days, involutes if not influenced by potassium iodid. A positive agar reaction with potassium iodid has been obtained by administering the iodid about four weeks after injecting the agar.

A thin starch emulsion, injected in the same manner, will, under the effect of potassium iodid, give a similar pustular reaction; but as yet the length of time has not been determined after which such reaction could be obtained. Insoluble substances, of the nature of bismuth, will not give this reaction, nor will vaccine such as the gonococcus vaccine.

Another point of note is that the administration of other drugs which contain iodin, such as thyroid extract, will develop a reaction similar to the potassium iodid. Painting the lesion with iodin, however, does not give the reaction.

The effect of the iodids on the luetin reaction has been tested in forty-eight cases, both syphilitic and nonsyphilitic, and the results obtained seem to justify the following conclusions:

CONCLUSIONS

1. A positive pustular or nodular luetin reaction can be obtained in 99 per cent. of all cases irrespective of the presence of syphilis, by the administration of potassium iodid, either simultaneously, or shortly before or after the intradermal test.

2. Other substances, such as agar and starch, when injected intradermally, will give a similar reaction when potassium iodid is administered, but with these substances the potassium iodid must be administered within a shorter time than is the case with the luetin.

3. Other drugs containing iodin have a similar influence on the luetin reaction.

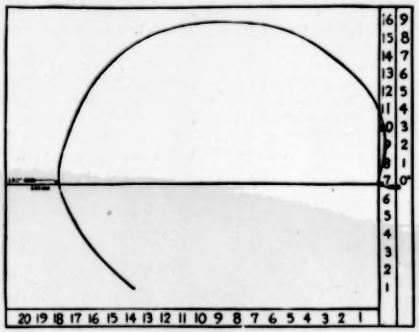

Fig. 1.—Method of adjusting points "glabella" and "inion" on the horizontal line at 0 and 180 degrees.

Fig. 2.—Spirit level with clip to attach to the arm of the calipers.

Smallpox.—In 1736 I lost one of my sons, a fine boy of 4 years old, by the smallpox, taken in the common way. I long regretted bitterly, and still regret that I had not given it to him by inoculation. This I mention for the sake of parents who omit that operation, on the supposition that they should never forgive themselves if a child died under it; my example showing that the regret may be the same either way, and that, therefore, the safer should be chosen.—Autobiography of Benjamin Franklin.

CRANIOMETRY IN DISEASES OF CHILDREN *

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WATERLOO, IOWA

There is a close conformation of the brain to the size and shape of the skull, and for this reason measurements of the craniums of living subjects must become of increasing importance. Studies directed to the changing brain mass by means of craniometry appeal especially to students of diseases of children because developments of physiologic and pathologic significance that may be detected by this method are very generally completed before the adult stage is reached. Of the normal factors that modify the shape of the skull, aside from variants, heredity, mental training and character development are the most important, while the abnormal factors are typically illustrated in children afflicted with rickets, syphilis and acromegaly.

It is readily admitted that the many conditions that control skull shapes render it difficult, with our present knowledge, to make positive statements relative to the value of craniometry as a diagnostic agent. It would seem, however, that any advance to be made in this matter will be based on the general acceptance and use of a simple system of cranial measurements, which it is my object to propose.

Owing to the fact that craniometry has been developed largely by workers in comparative anatomy, methods of measurement of the cerebral cranium that are of the first importance to physicians have received little attention. Such lines as have been established for cranial measurements on the living subject have generally been based on craniometric points on the dried skull, and they are therefore difficult to adjust and use. Indeed the usual lines employed in craniometry having fixed points on facial bones as, for example, that from the auricular point to the acanthion, or the more recently developed line from the auricular to the orbital points, have no constant relations with the plane of the lower surface of the cerebrum, which must, after all, be the base-line from which physicians can calculate the height and angles of the cerebral skull. For these reasons it seems to me to be desirable to establish, irrespective of less urgent considerations, a base-line extending from the glabella to the inion, as this closely

* Read before the Section on Diseases of Children at the Sixty-Sixth Annual Session of the American Medical Association, San Francisco, June, 1915.

follows the lower surface of the cerebrum and readily serves as a foundation for measurements for which physicians have the greatest need. The base-line here proposed meets the requirement of craniometry in that it may be set at a definite angle, which is, in this instance, 180 degrees. This is done by means of a chart (Fig. 1), and equally well by placing one point of a pair of calipers on the glabella and the other on the inion and tilting the head forward until a spirit level (Fig. 2) affixed to the arm of the calipers shows the desired point is reached.

The head may be fixed in this position by requiring the subject to grasp firmly with the teeth a soft wooden plate adjusted to the proper height on a buret stand (Fig. 3). If, now, it should prove to be desirable to establish the facial angle on a plane parallel with the cerebral base line, this can be done by first adjusting the head in the manner described and then, with the aid of a level, running such a line from the upper angle of the tragus to a desired distance in the vicinity of the external angle of the orbit.

In order to make a record of the profile of the skull a strip of lead about 1 cm. wide, 75 cm. long and 3 mm. thick should be carefully molded over the median line of the cranium from the glabella to the lower part of the occiput. This should be removed from the skull and placed on a chart in such a manner that the foremost end of the strip will be at the junction of the base-line and point 0 degrees, while the point inion on the lead strip, previously marked on its outer surface with chalk, will rest on the base-line also. With a well-sharpened pencil a satisfactory tracing may be made (Fig. 1).

Fig. 3.—Method of establishing and maintaining the cerebral base-line in a longitudinal position.

It is evident that if the two fixed points, glabella and inion, on the lead strip, are properly located on the base-line of the chart, the angle of inclination of the frontal and other bones shown in the tracing can be readily obtained for any measured distance. This is done in the case of the frontal bone, for, say 6 cm. above the glabella at point 0, by the use of the protractor on the tracing. In addition to this the position of the frontal bone relative to the perpendicular line ascending from point 0 of the chart may be marked plus or minus as it may appear, at a stated height, in front of or behind the line. For example (Fig. 1), at the height of 3 cm. above 0 the frontal bone is + 3 mm.

It will be observed (Fig. 1), that the tracing on a chart having squares 1 cm. in diameter will show the height of the cranium above the base-line at any desired point, and that changes in height resulting at a later time from any cause may be readily described on comparison with previous tracings.

The establishment of a base-line in the manner I propose makes it practicable to compare the greatest vertical height of the cranium with the length of the base-line and to express the differences in terms of percentage in the manner employed in obtaining the cephalic index of a skull. For example, if the base-line were 18 cm. and the greatest vertical height of the tracing 9 cm. the index would be 50. This index should be of service in describing a difference between two skulls such as that of the Kaffir and the negro where, though both are dolichocephalic, the former is markedly more high or long vertically.

It is desirable to give in terms of radius of curvature a description of the contour of the different parts of the surface of the cranium. For example, the median line of the frontal bone for a certain distance above the glabella may in a given subject be a plane surface, while the corresponding surface in another individual may have a radius of curvature of less than 75 mm. As this and all other cranial surfaces undergo considerable modification during early life, the determination of the amount of change in shape in different stages of development should result in information of value in diagnosis of diseases, and in determining the effects of mental training and character development in healthy subjects. The latter consideration appears to me to be of considerable importance, as the development of mentality and character in the race is coincident with symmetrical cranial lines and as, generally speaking, among present-day peoples the occurrence of abnormally sharp curves and flat surfaces appears to predominate in individuals who are least efficient as factors in social progress.

I have had F. A. Hardy & Co. of Chicago make a simple instrument for me (Fig. 4), which quite accurately measures the radius of curvature of the surface of the skull at any selected space of 6 cm.

ABSTRACT OF DISCUSSION

Dr. J. P. Sedgwick, Minneapolis: I have appreciated this paper because during the last year Dr. Taylor of the Minnesota clinic has been doing work along these lines and has found the literature on this subject very poor. Craniometry has many applications in various conditions in children which involve abnormal skull development. We had a child born in the University Hospital in which we noticed, within three or four days after birth, that the vertex was very high. It looked somewhat like a case of oxycephaly. There seemed to be also some intracranial pressure. The child was subjected to a careful examination and watched very carefully, and a cardiac murmur developed. The condition of the child gradually became worse and it died when 2 months old. At necropsy an aortic stenosis and a patent ductus arteriosus were found. The stenosis was at a point distal to the passing off of the blood vessels that supplied the head and the question arose whether the increase in the vertical measurement of the skull could be taken as evidence of heightened intracranial pressure.

Dr. C. G. Grulee, Chicago: One meets many irregularities of skull development and many problems come up in connection with them. Dr. Sedgwick just spoke of a case simulating oxycephaly. I had such a case; that is, it resembled his on the point of oxycephaly, but it was without the heart

condition. Another peculiar skull deformity was a case of akrocephaly-syndactylism. We thought the case ought to be reported and endeavored to read up on it but found that the literature on the subject of craniometry was very scant and that there was very little to be found from the standpoint of skull development. In the study of skull deformities and skull development this paper marks a distinct advance.

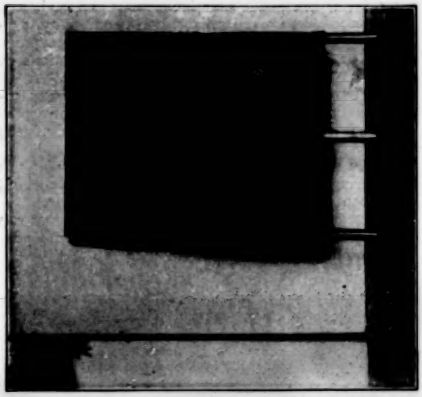

Fig. 4.—Instrument for measuring the radius of curvature of the surface of the skull.

DR. H. D. CHAPIN, New York: Some years ago we thought that data with reference to the head measurements of children might be of value and had an anthropologist measure the heads and also other parts of the body of children in the New York Juvenile Asylum. We made a comparative study of our data but found that we could not make any correlation between skull development and mental condition. Some of the children with the most unsymmetrical heads were brightest mentally. I feel that it is uncertain how much bearing the measurements of the skull have on the brain inside. The brain is very tolerant and can adapt itself to almost any condition, if that condition is slow in developing. I have seen many cases in which the brain did not seem to suffer from skull deformity. We measured about one hundred skulls and compared the results and we obtained a cephalic index, but that was about all we could get. The lead we used was not as heavy as that used by Dr. Clark, and in taking the measurements it would sometimes spring a little and we felt that this was an element of uncertainty in our work. I think Dr. Clark's study is of great value and shall be glad to follow it up.

DR. J. A. COLLIVER, Los Angeles: I would like to ask the essayist on what ground he based his conclusion that smoking had some effect on skull development. I have had ten years' experience in the Juvenile Court of Los Angeles, including the examination and record of over 600 cigaret fiends, and while I did not make an accurate observation as permitted with Dr. Clark's methods, I have never seen any such stigmata that were particularly characteristic of smokers. The size of the skull did not seem to be related in any way to the tobacco habit. In fact, the skull was practically fully developed in all my cases before smoking began.

DR. G. HARDY CLARK, Waterloo, Ia.: While the cephalic index has been of great use in anthropometric work, it has proved of no value, taken by itself, as a measure of mental acuteness or character development. The average index of high grade children and mental defectives in this country is about seventy-nine. It now seems possible that a character or morals score card constructed along the lines of that which I devised some years ago will be of service when used in connection with the Binet-Simon system, in securing the true mentality of an individual. Even in the present stages of the development of the work, considerable satisfaction may be found in comparing cranial measurements with the mental development of children. The lead tape I recommend is, of course, unusually heavy, but it gives quite satisfactory results. A jeweler can readily cut the strip from a piece of ordinary lead pipe. The mental and moral effects resulting from smoking tobacco are still *sub judice*, though the newer evidence undoubtedly supports the contentions of Lombroso that tobacco is a highly deleterious drug. My own inquiries and investigations strongly point to marked perversions and stunted mental development when this toxic agent is used by children. I think we may confidently look for changes in the developing cranium which will correspond with these mental effects.

SYMPTOMATOLOGY AND TREATMENT OF SOME COMMON PALMAR ERUPTIONS *

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The cutaneous disorders which commonly involve the palms and soles are relatively few in number. Aside from eczema, the dry syphilodermas, particularly the tubercular and papulosquamous varieties, are probably the most frequent offenders. In both eczema and syphilis the palmar involvement may be dependent on the generalized distribution of the eruption, but in the later stages of both diseases the cutaneous manifestations are frequently confined to the flexor surface of the hands.

Of the palmar eruptions which are directly or indirectly due to the action of pyogenic organisms, infectious eczematoid dermatitis is the commonest, although dermatitis repens, including the acrodermatitis perstans of Hallopeau, is not unusual, and during

Fig. 1 (Case 1).—Recurrent papulovesicular eczema of the palms, with slight scaling and exfoliation.

the past year I have encountered three cases of granuloma pyogenicum in this region.

Of the various forms of dermatitis which may affect the palms as a result of the action of external irritants, that due to liquor formaldehydi is in my experience the most frequent. It is especially common in laboratory workers and in embalmers, although surgeons and their assistants are often attacked. In

* Read before the Section on Dermatology at the Sixty-Sixth Annual Session of the American Medical Association, San Francisco, June, 1915.

chronic radiodermatitis, the lesions are usually confined to the dorsal surface of the hands and fingers, but occasionally, as in two cases that have recently been under my care, the palms also may be affected.

There appears to be a generally accepted belief that psoriasis often involves the palms alone, and that

Fig. 2 (Case 2).—Squamous eczema of the palms and flexor surface of the fingers.

when the lesions develop in this region they always display the peculiar and striking appearance that is so characteristic of psoriatic eruptions on other parts of the body. In reality, the disease seldom if ever occurs solely on the flexor surfaces of the hands, and in suspected cases which present no evidence of the malady elsewhere, the probability of a diagnosis of psoriasis may safely be ignored.

In generalized cases of icthyosis, the palms and soles are seldom markedly affected. In symmetrical keratodermia of the extremities (keratosis palmaris et plantaris hereditaria), a disorder which is sometimes referred to as "icthyosis palmaris et plantaris," the epidermal thickening is limited strictly to the flexor surfaces of the hands and feet, and is probably trophic in origin. Heredity is an important factor in many instances.

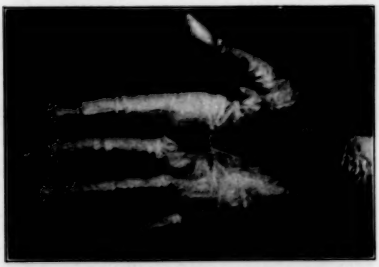

Fig. 3 (Case 8).—Seborrheic dermatitis of the palm.

Seborrheic dermatitis of the palms is usually secondary to the disease on the scalp and in the sternal and interscapular regions, a fact which Unna pointed out in his original description of the malady, and which has more recently been emphasized by Stelwagon and others. Aside from the superficial character of the eruption, the manifestations often bear a striking resemblance to those of lues, and inasmuch as the lesions are often mixed in character, in borderline cases it is sometimes necessary to resort to laboratory tests before a definite conclusion can be reached. Of the various aids at our disposal, Wassermann's serum reaction is probably the most popular, with histopathologic examinations of biopsied tissue second, and Noguchi's luetin test third. The latter is a convenient and inexpensive method, and in my hands has proved reliable and trustworthy, particularly in the old and neglected cases of syphilis which commonly give rise to dry, scaly eruptions of the palms.

In the Southern States, pompholyx is a comparatively common disorder, and, as a rule, involves the flexor surface of the hands, and the sides of the fingers.

Of the somewhat rarer maladies, one example each of pityriasis rubra pilaris and keratosis follicularis have been included for purposes of comparison.

The general characteristics of the various types can best be illustrated by means of the accompanying photographs and case histories.

Fig. 4 (Case 9).—Psoriasis of the palm of five and one-half years' duration.

Case 1.—Recurrent, papulovesicular eczema of the palms and fingers in a girl, aged 15. The disease had been present at intervals for more than three years. The lesions began as reddish, intensely itchy macules, and papules and vesicles quickly followed. New lesions usually developed as rapidly as the old ones disappeared, and an attack generally lasted two or three months. There was very little thickening or fissuring, but always more or less moisture. Severe itching and burning were frequently present, particularly if the hands were allowed to come in contact with soap and water.

Case 2.—This represents a rather uncommon variety of squamous eczema of the hands. The patient was a stenographer, aged 34, an exceedingly "high-strung" woman who for many years had been subject to outbreaks of eczema of the so-called "flexural type." The palmar integument was only slightly thickened, but was dry, inelastic, scaly and fissured. The eruption was fairly symmetrical, and had been present fourteen months. The pruritus at times was intense, and there was some accompanying burning pain.

Cases 3, 4, 5 and 6.—These are illustrative of a fairly common type of chronic eczema of the palms. All of the patients were adults, between the fifth and seventh decades of life, and in every instance the disease had been present for more than one year. The affected skin was thick, horny, inelastic and fissured. There was very little itching, but

the fissures, which were arranged longitudinally on the palms and transversely on the flexor surface of the fingers, were at times exceedingly painful and troublesome. The frequent use of soap and water invariably renders the condition worse. Exposure to other external irritants appears to play but little part in the causation of this type of eczema. Case 3 occurred in a minister of the gospel, Case 4 in a physician, Case 5 in a semiretired housewife, and Case 6 in a wholesale liquor dealer.

Histologically, one finds the papillary hypertrophy with capillary dilatation and perivascular cellular infiltration, acanthosis and parakeratosis which are characteristic of chronic eczema no matter where it may be located.

CASE 7.—This may be considered as a borderline case, presenting features of both chronic eczema and seborrheic dermatitis. The patient was a physician, aged 51 years, and the malady had first appeared three years prior to the date of consultation. Both palms were affected. The skin was thickened, but was fairly flexible, and there was no fissuring. Below the thenar eminence on the left hand was a large, deep-seated vesicle which had been ruptured and from which some sticky fluid exuded. Aside from the itchiness in the vicinity of this lesion, there were no subjective symptoms. The skin on the anterior half of the palm and on the flexor

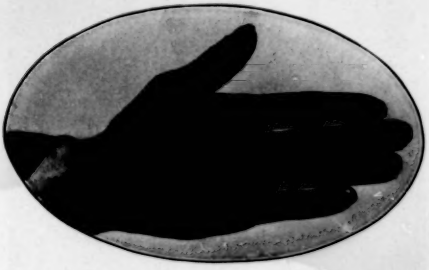

Fig. 5 (Case 10).—Condition of palm in a case of keratosis palmaris et plantaris hereditaria.

surface of the fingers was slightly thicker than normal, and was smooth and glossy. The Wassermann reaction was negative.

CASE 8.—This represents a chronic inflammatory disorder which, for lack of a more appropriate diagnosis, I have placed with the seborrheides. During the past year I have seen two cases of this type, one in a woman of 30, the wife of a physician, the other in a traveling salesman, aged 36. In both instances only the palms were affected, and the disease had been present for several years. The skin was of a yellowish, resinlike color, glossy and fairly smooth. The thickening was uniform throughout, and scaling practically absent. The entire flexor surface of both hands was involved, and the inflammatory process was sharply limited to these areas, except at the wrist, where the eruption extended slightly beyond the palmar margin. The affected skin was dry, and had never been moist or vesicular. The woman was the mother of two healthy young children. The man claimed to be free from syphilis, and there was no reaction to luetin. Unfortunately, neither patient was willing to submit to a biopsy, and no tissue was secured.

CASE 9.—This is a fairly representative one of psoriasis of the palms. There were accompanying lesions on the elbows and knees. The patient was a boy, aged 16, and the disease had been present five and one-half years. The integument was uniformly thickened, and dark red in color. There was very little fissuring, although movement was considerably impaired. The scaling was comparatively slight. As in all psoriatic eruptions, the lesions were dry, and subjective symptoms were practically absent.

CASE 10.—Keratosis palmaris et plantaris hereditaria. The patient was a young man, aged 20. The disease had existed for four generations on his mother's side of the family. Both the palms and the soles were affected. No other part of the body was involved. The skin was dry, horny and

Fig. 6 (Case 11).—Keratoses on the palm due to the long continued action of the Roentgen rays.

keratotic, and its natural lines greatly exaggerated. Owing to the lack of flexibility and elasticity, fissuring was not infrequent, the resulting lesions being very tender and painful.

CASE 11.—A pioneer roentgenologist failed to appreciate the danger associated with his specialty until he had incurred lasting injuries of both hands. The dorsal surface was the seat of numerous keratoses, several of which have recently become malignant. The palms were less seriously affected, although they too presented characteristic evidence of long-continued actinic irritation. The skin was dry, thickened and inelastic. In addition to the score or more of keratoses present, there was a small, prickle-cell carcinoma in the center of the left palm. Histologically, the smaller lesions were precancerous in character, and the malignant growth exhibited the vascular changes and hyperkeratinization which are typical of growths of this type.

CASE 12.—This is a representative one of infectious eczematoid dermatitis affecting the palm. The disease began with a paronychia which involved the nail of the left forefinger

Fig. 7 (Case 12).—Infectious eczematoid dermatitis of the palm.

and had been present five weeks. The skin surrounding the individual pustules was reddened and inflamed. The outer corneous layers were undermined with pus. Pure cultures of the *Staphylococcus albus* were secured from several fresh, unruptured lesions. Histologically, the papillae were swollen, edematous and infiltrated, and the interpapillary vessels dilated. There was a considerable degree of acanthosis present, but no pus collections in the rete. The destructive process was limited to the structures overlying the stratum

lucidum, the superficial corneous layers being elevated, frayed and broken.

CASE 13.—The flexor surface of the hands is a favored site for the lesions of dermatitis repens, mainly because of the thick, tough, resistant character of the horny layer in this locality. In this instance the attack followed a slight infected wound of the hand, and ultimately involved the entire cutaneous covering of the base of the thumb. Pathologically, the process is somewhat allied to that occurring in infectious eczematoid dermatitis, but in dermatitis repens it is much more deeply seated, and numerous abscesses are found throughout the prickle layer in the affected areas. In this disease also, the yellow or white staphylococcus is the offending organism.

Fig. 8 (Case 13).—Infectious eczematoid dermatitis, showing papillary enlargement, with congestion, acanthosis, and corneous exfoliation (moderate magnification).

Fig. 9 (Case 14).—Dermatitis repens involving the palm. A portion of the corneous collaret has been clipped away.

CASE 14.—Granuloma pyogenicum of the palm I formerly considered of rather unusual occurrence. Like many other supposedly rare conditions, however, its true nature is often unrecognized. In the present instance the little tumor, which was cherry-sized, bright red, and bled freely on the slightest provocation, developed following a puncture wound of the left thumb. It had been present three months, and had been subjected to many and diverse methods of treatment when the accompanying photograph was taken. Histologically, the growth consists of granulation tissue, and is more suggestive of an angioma than of anything else.

Of the various palmar syphilids, only a few types will be considered.

CASE 16.—This represents a macular eruption of the palms occurring as part of a generalized efflorescence at this stage of the disease. The lesions are dusky red, erythematous macules, distributed with a fair degree of symmetry, and give rise to no subjective symptoms.

CASE 17.—In this case, a syphilid of the maculopapular type, the lesions are more sharply defined, and when viewed at an obtuse angle they appear distinctly elevated. In reality, owing to the thickness and density of the overlying stratum corneum, the surface of the skin is perfectly smooth.

Fig. 10 (Case 14).—Dermatitis repens, showing papillary enlargement, and infiltration, with acanthosis and the formation of numerous minute abscesses in prickle layer, and exfoliation of the entire horny layer (moderate magnification).

CASE 18.—This is of the large lenticular papular type, and the eruption on the palms consists of round-topped, ham-colored tubercles, from the summits of which the outermost layers of the epidermis have exfoliated.

CASES 19 and 20.—These represent early and late examples of secondary syphilis in which there is an intermixed seborrheic element. The surface of the skin is smooth and glossy, and the amount of scaling comparatively slight.

CASES 21 and 22.—These two examples also are suggestive of seborrheic dermatitis, but the segmental and circinate outlines of the lesions, the fact that they are deeply infiltrated, and that in each instance only one hand is involved, all are indicative of lues.

CASES 23 to 27.—These are illustrative of the later stages of syphilis. It is exceedingly probable that trauma is an important factor in the localization of many of these lesions. Of the five illustrative cases, all occurred in right-handed individuals, and in every instance this hand was the one affected. From eczematous eruptions the lesions are to be differentiated by their unilateral distribution and peculiar configuration, their reddish, beefy color, their history, and the absence of itching. Should any doubt exist regarding the true nature of the eruption, recourse should be had to a serum or a luetin test.

Pompholyx is so common and distinctive a disorder that little space need be allotted to it here. The acute onset of the disorder, the symmetrical distribution of the lesions, and their self-limited duration are usually sufficient for differentiation. Only two examples, both of which were somewhat unusual, will be discussed.

CASE 28.—In the first, the eruption on the hands was practically confined to a small area (measuring about 5 by 7 cm.), in the center of each palm.

CASE 29.—In this case the palmar lesions were not hemorrhagic, but on healing they left sharply defined patches of pigment which persisted for some weeks.

CASE 30.—In pityriasis rubra pilaris, palmar manifestations, if present, are usually but a part of the generalized eruption. Instead of the small, acuminate, spinous projections which are characteristic of the disease on other parts of the body, however, here the integument sometimes assumes a peculiar, pig-skin-like appearance which is very striking.

Fig. 11 (Case 15).—Granuloma pyogenicum of the palm of three months' duration.

CASE 31.—It is not unusual to find the palms and soles involved in extensive cases of keratosis follicularis. Instances in which the disorder is confined to one or more of these regions are comparatively rare, however; and for this reason the accompanying photograph and section are of interest. Only the flexor surfaces of the hands were involved. The disease had been present fifteen years (the patient was a man, aged 46). Superficially, the surface had the appearance of a target that had been peppered with birdshot. There was but little associated keratodermia. Subjective symptoms were absent.

The general plan of treatment for the various conditions that have been discussed may be briefly summarized as follows:

In actively inflamed lesions, soothing applications, such as carbolized calamine lotion and zinc-oil, should be employed at first, to be followed, if necessary, by the use of local stimulants (particularly those containing tar). Soap and water are to be avoided. In chronic eczema of the palms, recourse must often be had to the more powerful keratolytics and reducing agents. Of the various chemical keratolytics, salicylic acid (in strengths of from 5 to 20 per cent.) is one of the most efficient and reliable. It may be advantageously prescribed alone or combined with green soap, in the form of a plaster, or in an ointment. Of the commoner tar preparations, oleum rusci (oil of white birch) is superior to oleum cadini (oil of cade). It is best employed in ointment mixtures, and in strengths of from 8 to 20 per cent. Radiotherapy often proves valuable in combating this type of the disease, and if the affected areas are not too large, radium also may be employed with benefit. In a few

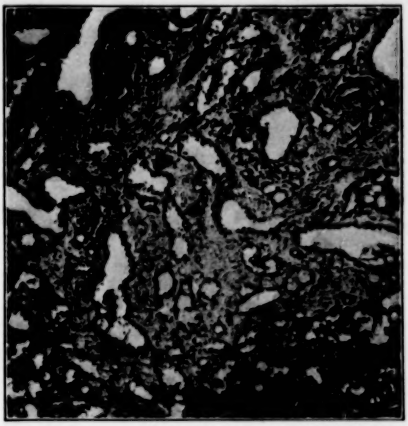

Fig. 12 (Case 15).—Illustration of characteristic histopathology of pyogenicum (moderate magnification).

instances in which the latter agent was used, I have noted improvement even on untreated surfaces. The cases were very intractable ones, the lesions having failed to respond to numerous other therapeutic measures, and it is difficult to account for their sudden disappearance unless it was due to the action of the mineral.

In infectious eczematoid dermatitis, the lesions usually respond promptly and favorably to a 5 per cent. ammoniated mercury ointment. Dermatitis repens is

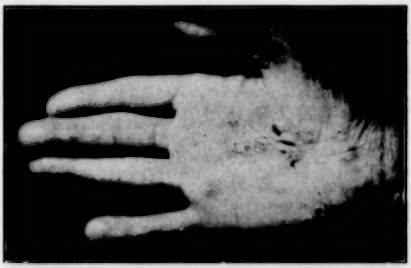

Fig. 13 (Case 18).—Late papular syphilid of the palm, with exfoliation of superficial corneous layer.

much more rebellious, however, owing to the deep-seated character of the abscesses. The frayed and undermined corneous collar should be trimmed away, and Ruggles' mixture (salicylic acid 2 parts, tannic acid 10 parts, and alcohol 88 parts) applied freely several times daily. Occasionally a saturated aqueous solution of pyoktanin blue proves serviceable. In

many instances it will be found necessary to resort to the use of autogenous vaccines before the progress of the disease is checked.

After a thorough trial of all the various methods that have been suggested for the eradication of the growths in granuloma pyogenicum, I believe thorough congelation with Pusey's carbon dioxid snow to be the best. The top of the lesion is clipped off, and the base frozen for a period of at least one minute. Afterward the part is painted with tincture of iodin, and a thymol iodid dressing applied.

Fig. 14 (Case 21).—Segmental and circinate squamous syphilids of the palm (the so-called "psoriasiform syphilid").

Syphilitic eruptions of the palm generally require very little local treatment, although the liberal employment of a calomel (10 per cent.) or ammoniated mercury (10 per cent.) ointment will hasten their disappearance. Of the various constitutional remedies, I have found injections of mercury salicylate, in the following mixture, superior to all others:

		Gm. or c.c.	
℞	Mercury salicylate	2	gr. xxx
	Anesthesin	2	gr. xxx
	Lanolin	4	ʒ i
	Olive Oil q. s. ad	30	ʒ i

M. Sig.: Shake and inject 10 or more drops into the gluteal muscles, twice weekly. The dose should be gradually increased until the physiologic effect is secured. Occasionally it is advisable to administer sodium iodid at the same time, but in the majority of instances the mercurial preparation is all that is required.

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ABSTRACT OF DISCUSSION

Dr. A. Ravogli, Cincinnati: I congratulate Dr. Sutton on the beautiful demonstration he has given to us; and I can only say that some of his first cases in which he showed an eczematous condition of the hand, resembled some of my cases, which I found in my practice stubborn to treatment. I succeeded in finding the tricophyton, and by constant applications of Wilkinson's ointment I obtained results in about eight, ten or twelve days. From the frequency of these cases affecting mostly the palms, I concluded that inoculation could have occurred, the tricophyton being communicated by hanging on to the straps in a street car. Since then I consider dangerous taking hold of the straps in the street car, because of the possible presence of *Tricophyton tonsurans*.

Dr. W. A. Pusey, Chicago: Dr. Ravogli anticipated my thought on the subject of tricophyton of the palm. I have had it brought home to me that tricophyton palmus cannot be neglected by us; and in such a group of cases as this, I believe the occurrence of tricophyton or polycyclic patches on the hand, as determined by ringworm, must be thought of. I venture to call attention to the remedy I have been using in these cases: I have employed with great advantage 2 per cent. iodin in benzoin. It seemed to me to be a remedy of sufficient value to deserve attention. I got that from Dr. Politzer. I wondered why Dr. Sutton did not resort to cold in the treatment of this trouble with the hands, but I leave that to the discussion of our San Francisco colleague.

Dr. Howard Morrow, San Francisco: I would like to call attention to the importance of the clinical diagnosis of palmar syphilis. Dr. Sutton spoke of the advantage of the Wassermann reaction, but frequently we find cases of syphilis of the palms with characteristic location and color in which there is a negative Wassermann reaction. These must be put on specific treatment, notwithstanding the complement fixation.

Dr. Ernest Dwight Chipman, San Francisco: The set of photographs shown by Dr. Sutton, served to corroborate a pet theory of my own in establishing a differential diagnosis between an eczematous condition of the palm and late tubercular syphiloderms. It has been my observation that the latter nearly always begin in the very center of the palm and spread peripherally. Very frequently they are limited to the palm itself, and do not extend to the fingers, while eczematous lesions begin on any portion of the palm and are definitely inclined to spread to wrist or fingers.

Dr. Douglass W. Montgomery, San Francisco: Lesions of the palm are among the most stubborn we have to deal with, and yet we dermatologists have to proceed against them particularly, because they refuse to yield to the measures adopted by the general practitioner. The treatment of chronic eczema of the palms has recently been considered by Dr. Culver. We have found the Roentgen ray an admirable aid in the treatment, and we think, as Dr. Sutton says, that it tends to prevent recurrences. This is interesting as indicating a possible connection between hyperhidrosis and the persistence of inflammatory lesions of the palms. We are inclined to the belief that hyperhidrosis of the palms is present often when it does not appear as such, as in many cases the sweat may diffuse itself in the rough thickened horny layer before reaching the surface. The Roentgen ray we know controls sweating, and it may in this way influence the dependent lesion both as regards its cure and also in regard to the permanence of its cure.

Dr. Howard Fox, New York: I agree with Dr. Sutton in regard to psoriasis of the palms. I do not see how it is possible to make a diagnosis of psoriasis of the palms when there are no accompanying lesions on the rest of the body. I also do not see how psoriasis and eczema of the palms can be distinguished. Dr. Sutton spoke of the late syphilids on the right palm. They are not all on the right palm as the photographs exhibited will show. It is quite possible, of course, that some of these persons in whom the lesions occurred on the left palms, were left handed. The old rule that a squamous eruption on one palm is syphilitic, on both palms eczematous, holds good in about nine out of ten cases. One of the diseases of the palms in which serious mistakes in

Fig. 15 (Case 29).—Pompholyx, showing pigmentation of the affected areas.

diagnosis are sometimes made, is a form of erythema multiforme. In this disease the eruption occasionally consists of discrete macular and maculopapular lesions on the palms which closely resemble a secondary syphilid. When such an eruption is also accompanied by lesions in the mouth of bullous erythema multiforme the similarity to syphilis is even more marked.

DR. EVERETT S. LAIN, Oklahoma City: I have met with some puzzling cases of sweating and disease of the palms.

Fig. 16 (Case 31).—Keratosis follicularis, showing arrangement of corneous layer at the orifice of a coil gland duct (moderate magnification).

Dr. Sutton has only touched on this subject, and yet he has given a rather elaborate review on this point. There are so many of these eruptions, and many different varieties, and we treat them differently. Some yield nicely to treatment and some do not. There are cases in which you feel that the diagnosis is the same and yet the same treatment does not apply. The same is true of all other forms of eczema. My experience in this class of cases with Roentgen ray coincides with the experience of Dr. Montgomery, namely, that in such eruptions as those in which we have hyperhidrosis, eczema will follow. In fact I have made a rule to predict an eczema of the palms when I have seen patients who have a continuously cold, sweaty hand. In this type the Roentgen ray has given very satisfactory results; also in the weeping or moist hands or palms. In the dry, squamous type, however, I have not found the Roentgen ray so successful. It perhaps serves as an aid, but I have learned to use it almost entirely now with the moist types of these eruptions. In the dry scaly types we depend more on the stimulating ointments such as Dr. Sutton mentions.

DR. A. J. MARKLEY, Denver: During the past few years I have been struck by the frequency with which the late lesions of syphilis occur on the palms alone. Within the past few months several cases have come under my notice in which there was no history of previous eruptions, and yet definite evidence of lues in the palms. This location furnishes frequent evidence of latent syphilis, and we should carefully examine the palms more often than we do.

DR. J. C. PICKETT, San Francisco: I wish to mention two cases of ringworm of the hand which I have seen in the last few months. One was on the hand of a woman. The lesions extended from the fingers to the palm and originated from scratching between the toes where the original lesion was found. In the second case the lesion began on the index finger and extended to the palm. In this case the infection was also transferred by scratching, the original lesion being around the anus.

DR. GEORGE D. CULVER, San Francisco: I should like to ask Dr. Sutton to elaborate on his preference for salicylate of mercury over salvarsan for palmar syphilids. I have been led to believe that the use of salvarsan in the cases of doubtful palmar lesions is of the greatest diagnostic value. In my experience many of the doubtful cases have cleared up after one dose of salvarsan even when there was a negative Wassermann. None of the palmar syphilids have failed to yield to this remedy.

DR. RICHARD L. SUTTON, Kansas City, Mo.: With regard to palmar tricophytosis, the condition must be a somewhat rare one. Up to the present I have never encountered a case in America or elsewhere. Dr. Morrow is undoubtedly correct in regard to the fallibility of the serum test in some cases of palmar syphilis. In many instances both the histology and the laboratory findings are negative, and resort must be had to a so-called therapeutic test. In my experience salvarsan, even though administered intramuscularly (a method which is far superior to the intravenous), has proved inferior to the salicylate injections in eradicating tubercular syphilodermas of the palms. Dr. Montgomery's suggestion with respect to the occurrence of hyperhidrosis in the hyperkeratotic cases is illuminative and worthy of further study and investigation. I agree with Dr. Lain that the moist cases respond more satisfactorily to Roentgen therapy than do the dry types. I believe that the point made by Dr. Chipman is a valuable one, particularly with reference to the late, tubercular and gummatous varieties of syphilis. For further information on the histopathology of pompholyx, I would respectfully refer Dr. Pusey to a paper which was read before this section at the Minneapolis meeting in 1913.

THE ESTIMATION OF CARBON DIOXID TENSION IN ALVEOLAR AIR*

PAUL ROTH, M.D.
BATTLE CREEK, MICH.

Metabolic disorders are often accompanied by a disturbance of the equilibrium between acids and bases in the blood. Of frequent occurrence is an excess of acids over bases, a condition designated by the term "acidosis." A departure from the normal in the opposite direction is termed "alkalosis." Either of these conditions is an intoxication which in its intense form leads to symptoms of gravest import. Under normal conditions, this is very efficiently guarded against by physiologic mechanisms for the preservation of the neutrality in the body fluids, as shown by L. J. Henderson.[1]

Reported observations along this line by A. W. Sellards[2] and others show that there are evidently forms of acidosis different from the one so common in diabetes. On the whole, acidosis is of frequent occurrence. It has been recognized in children during the exanthems, in high continued fever, in even slight intestinal infections (F. Krauss), in typhoid fever (Kopfe), and in many other febrile conditions (Hallervorden), in starvation, infectious diseases, gastro-intestinal disturbances, eclampsia, phosphorus poisoning, narcosis, especially in the well-known postoperative acidosis.[3] It is easily induced in health or disease by any dietary restricting the intake of carbohydrates. I have found it often in the obese under a fat-reducing regimen. It can hardly be doubted that uremia is accompanied by a high degree of acidity in the blood.[4]

* Read before the Section on Pathology and Physiology at the Sixty-Sixth Annual Session of the American Medical Association, San Francisco, June, 1915.
*From the Clinical Laboratories of the Battle Creek Sanitarium.

1. Henderson, L. J.: The Theory of Neutrality Regulation in the Animal Organism, Am. Jour. Physiol. 1908, xxi, 427.
2. Sellards, A. W.: Bull. Johns Hopkins Hosp., 1914, xxv, 101.
3. Taylor: Digestion and Metabolism, Philadelphia, Lea and Febiger, p. 362.
4. Von Noorden: Metabolism and Practical Medicine, Chicago Medical Book Publishing Co., ii, 485.

Pronounced acidosis is a grave and distressing complication in disease, and although it is occasionally so well borne that it apparently produces no ill effects when of moderate intensity, it should be considered detrimental, even in its milder forms. I believe, also, that therapeutic measures adopted to prevent or to check it will always result in greater success in treating various affections. As proof of this assertion, I may call attention to the present revolution in our ideas in the management of fevers and the surprising results reported following the more liberal administration of food, particularly of carbohydrates, not only in fevers but also in surgical cases. This radical change in the diet of these patients, suggested by the results of such investigations as those of Coleman, and Dubois[5] was not for the specific purpose of holding acidosis in check; nevertheless to this I must, in part, at least, attribute the beneficial results obtained. In connection with his surgical work at the Battle Creek Sanitarium, Kellogg has for the past three years endeavored with success to prevent and to combat postoperative acidosis by a systematic administration, either per os or per rectum, of nutriment rich in carbohydrates, particularly during the period of preparation for operation, and also as soon as possible after operation. In surgical work, it is of the utmost importance to recognize a preexisting acidosis which would inevitably be increased by the usual dietetic restrictions before operation, and which may later develop into a dangerous, sometimes fatal, postoperative acidosis.[5] Practically all major surgical cases show a marked acid intoxication as confirmed by both the urinary findings and the carbon dioxid tension.

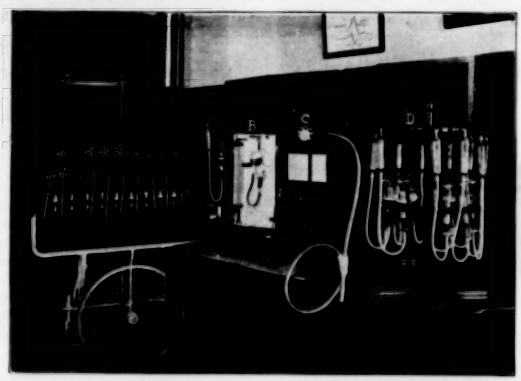


Fig. 1.—Complete outfit for collecting and analyzing samples of alveolar air in the determination of carbon dioxid tension. *A*, carrier for collecting samples in room of ward; *B*, Haldane apparatus (small type) for air analysis; *C*, collecting tube with valve and mouthpiece; *D*, revolving buret stand.

Taylor[7] has explained how a long-continued acidosis of even mild intensity must inevitably lead to dangerous abstraction of cations from the tissues. In view of these facts, the importance of determining and combating acidosis in all its forms and intensity is apparent. Too much insistence cannot be placed on its early detection and on the necessity of the timely adoption of proper therapeutic measures. I believe that measures to combat acidosis are often delayed until it is too late to obtain any but temporary results.

A number of methods have been suggested for measuring the degree of acidosis. Palmer and Henderson[8] suggest that the condition of acidosis may be assumed to exist when an administration of a quantity of alkali equivalent to 1 liter of tenth normal solution fails to produce a diminution of the acidity of the urine.

"The mere estimation of urinary acidity is of little value in determining the intensity of acid formation," says Krauss, who adds, "More is afforded by the lateness of the appearance of alkalinity after the administration of salts of the alkali metals by the mouth."[9]

The estimation of urinary ammonia has for years been advocated as a fairly reliable measure of the intensity of acidosis of any type, and much dependence has been placed on this method by various authors. I have, however, had occasion to doubt its reliability when comparing day after day the urinary ammonia output with results obtained by the carbon dioxid tension.

Henderson and Walker's work on "Factors of Acid Excretion in Nephritis," published in the *Journal of Biological Chemistry*, for May, 1915, shows very conclusively that the usual interpretations of the urinary findings are at times erroneous and that even high acidosis can be accompanied by a constant diminution of urinary ammonia.

The detection of acetone alone in the urine is not an indication of acidosis. The appearance of diacetic acid and beta-oxybutyric acid marks the onset of acidosis, while acetone is its precursor when found without the acids.

Suffice it to say here, that the quantitative output of each one of these ketonic bodies is not proportional. Therefore, the estimation of acetone and of diacetic acid is not always a true indication of the probable amount of beta-oxybutyric acid present in the same specimen. Further, the total elimination of these same bodies may be considerably reduced as the result of retention and accumulation in the blood, resulting, of course, in a lowered urinary output with an increased acidosis.

While all the above methods have points of specific advantage, and can serve as indications of the presence of acidosis, none are suitable for an accurate measurement of its intensity. Moreover, their availability is limited, while some require too much time to be of any practical value for clinical purposes.

Compared with other methods, I find, as declared by Y. H. Henderson,[10] that the estimation of the carbon dioxid tension in alveolar air is as yet the most accurate available method for recognizing and measuring the intensity of acidosis. The process of elimination

5. The Influence of the High Calory Diet on the Respiratory Exchanges in Typhoid Fever: Arch. Int. Med., August, 1914, p. 168.
7. Taylor: Note 3, p. 405.
8. Palmer, W. W., and Henderson, L. J.: Clinical Studies on Acid Base Equilibrium and the Nature of Acidosis, Arch. Int. Med., August, 1913, p. 153.
9. Von Noorden: Metabolism and Practical Medicine, ii, 160.
10. Henderson, Y. H.: The Time that the Breath can be Held as an Index for Acidosis, The Journal A. M. A., July 25, 1914, p. 318.

in the kidneys, while being in some respects identical with that of the lungs, is much more complex and subject to variations not encountered in the comparatively simple and exceedingly rapid exchange of gases in the lungs. The quantitative relation between the carbon dioxid tension in the blood and in the alveolar air is much more constant than the quantitative relation between any given substance found both in the blood and in the urine.

That acidosis can be determined effectively through the estimation of the carbon dioxid tension in alveolar air, was shown several years ago by Porges, Leimdorfer and Markovci.[11]

Decreased alkalinity of the blood as in acidosis is accompanied by a corresponding decrease of carbon dioxid tension in the blood, while an increased alkalinity results in a corresponding increase of its carbon dioxid tension. The tension of carbon dioxid in the blood being represented by the carbon dioxid in the alveolar air,[12] observers have readily noted that with rare exceptions an increase of acidosis corresponds to a proportional decrease in the carbon dioxid tension in the alveolar air. This method of determination of acidosis has, as yet, been confined mostly to the experimental laboratory because the quantitative analysis of air, as that of any gas, is attended with difficulties of manipulation rarely encountered in the usual analysis of liquids. The introduction of simpler methods in the determination of the carbon dioxid contents of alveolar air will soon place the test among those that are considered indispensable in the practical management of many acute as well as chronic affections.

Fig. 2.—Manner of collecting the sample of alveolar air from subjects able to sit up. Note clip on nose of subject; right hand of operator is on crown of valve; left hand supports valve and tube, the index finger closing small opening underneath rubber tube close to valve.

METHODS AND TECHNIC

Space will not permit a full description of the methods recommended, but reference may be made to "A Comparison of Methods of Obtaining Alveolar Air," [13] "The Influence of Food, Posture and Other Factors on the Alveolar Carbon Dioxid Tension in Man." [14]

In modifying standard methods or in adopting new procedures, my aim has been to overcome difficulties encountered in our efforts to make free use of the test for clinical purposes. I have also endeavored to perfect a plan of procedure which would be simple, practical and easily mastered by any one having a limited laboratory training.

METHODS OF OBTAINING ALVEOLAR AIR

For general use and particularly when dealing with untrained subjects, with patients who are unable to lend any degree of cooperation or even with the unconscious, the best method would be:

1. The one requiring the least amount of intelligent cooperation on the part of the subject.

2. The one requiring the simplest form of apparatus, easily and quickly cleaned and sterilized. When dealing with patients whose condition enables them to lend a fair degree of cooperation I use the Haldane method with the only difference that I secure for each determination two samples, both of which, for the sake of simplicity, are taken alike from a rapid and complete expiration following a normal inspiration. Occasionally the two samples may vary more than 1½ or 2 mm., in which case the error would logically be in the lower result, which is then entirely discarded. Otherwise, when the results compare closely, as they most often do after the first or second test, the average of the two is reported. (For over a year, I have added to this a very simple qualitative test for acetone in the breath.[15] The patient is simply asked to breathe through a glass tube into a test tube containing a few cubic centimeters of an alkaline solution of mercuric cyanid and silver nitrate. Acetone will give an opalescent precipitate in such a solution, and it is reported simply in terms of "trace," "+," etc.)

AUTHOR'S METHOD

For collecting samples from patients who are unconscious or from those who for any reason whatsoever cannot cooperate, I suggest the following method, which has proved to be the most simple and satisfactory. The subject breathes normally back and forth for twenty-five seconds into the same collecting tube used in the Haldane method, with the valve turned so as to connect the patient from the start with the rubber tube. At the end of the twenty-five seconds as nearly as possible at the end of an expiration, the valve is turned to seal the sample obtained in the rubber tube, from which it is tranferred at once into the sample buret. From numerous observations, I find that the results are quite similar

11. Porges, Leimdorfer and Markovci: Ueber die Kohlensäurespannung des Blutes in pathologischen Zuständen, Zischr. f. klin. Med., 1911, lxxiii, 389.
12. Haldane and Priestley: Jour. Physiol., 1905, xxxii, 25.
13. Boothby and Peabody: A Comparison of Methods of Obtaining Alveolar Air, Arch. Int. Med., March, 1914, p. 497.
14. Higgins, H. L.: Am. Jour. Physiol., April 1, 1914.
15. Scott and Wilson: A Method for Estimating Acetone in Ammoniacal Liquids, abst., Jour. Physiol., 1911, xliii, 456.

to those obtained by the Haldane method. The rapid diffusion of carbon dioxid gradually raises its tension toward and into the long tube. At the end of twenty-five seconds I find that this tension in various individuals is very much the same as that obtained with the

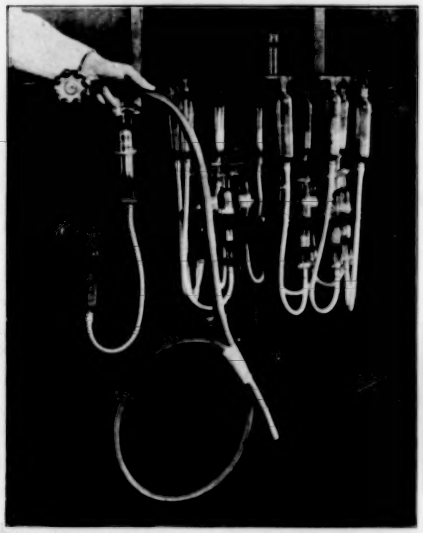


Fig. 3.—Manner of transferring collecting tube to stand and connecting sample air buret with tube through the small aperture. On opening the upper three-way cock the mercury filling upper buret passes into the other. When full the buret is connected with Haldane's apparatus (Fig. 4). The lower disk of the revolving stand is for catching the mercury that may escape when transferred back from lower to upper buret.

same subjects at the end of a rapid and complete expiration. I further find that within certain limits, the *number of respirations* does not alter the tension materially, provided the total *time* during which the patient is made to breathe into and from the long tube is the same.

TABLE 1.—COMPARISON OF THE AUTHOR'S WITH HALDANE'S METHOD FOR COLLECTING THE SAMPLE *

Date	Method	L. A. Successive Samples	
		mm.	mm.
April 18	H	(1) 42.6	(2) 43.3
	R	(3) 44.1	(4) 43.8
	H	(5) 43.1	(6) 43.0
	R	(7) 43.9	(8) 42.8
April 21	H	(1) 38.7	(2) 37.5
	R	(3) 39.1	(4) 41.3
	H	(5) 38.9	(6) 37.8
	R	(7) 42.7	(8) 42.9
	H	(9) 41.6	(10) 36.6
	R	(11) 35.0	(12) 34.9

* H = Haldane's method with full expiration following a normal inspiration. R = author's method following five respirations in about twenty-five seconds, except Nos. 10, 11 and 12, taken following five respirations in twenty seconds only.

A similar observation was made by Porges and confirmed by Boothby and Peabody,[13] when breathing into a closed bag as in the Plesch and Higgins methods. I do not hesitate to recommend my method of collection for general clinical use, although I personally like to compare results as often as practicable with Haldane's method.

Results are interpreted as follows: When the carbon dioxid tension in alveolar air is normal, there is no appreciable acidosis, even if acetone is present in more or less large quantities in the breath. Acetone in the breath in such cases, however, indicates the border line of acidosis. The results obtained vary more or less in the same individual according to the method employed, but with my method as also with Haldane's, the normal varies between 35 and 43 mm. in different individuals, though practically the same day after day in the same individual. A tension below the minimum normal indicates an acidosis proportional to the fall of tension. Tensions of 15 to 20 mm. indicate threatened coma. In coma the tension may fall as low as 5 or 6 mm. or less until death occurs, when inevitably it falls to zero.

For hospital work, the equipment represented in Figures 1 to 5 leaves little to be desired for rapid and convenient manipulation. The carrier on wheels serves to collect the air samples from patients in their rooms or ward. The analysis is made in the laboratory by means of Haldane's small type of air analysis apparatus. One apparatus is reserved exclusively for the estimation of carbon dioxid and has been stripped of all unnecessary parts to make it easily cared for. Certain modifications have also been introduced and are briefly: (*a*) The graduated scale (G, Fig. 4) on the side of the tube containing the measuring and compensating burets; this scale facilitates the

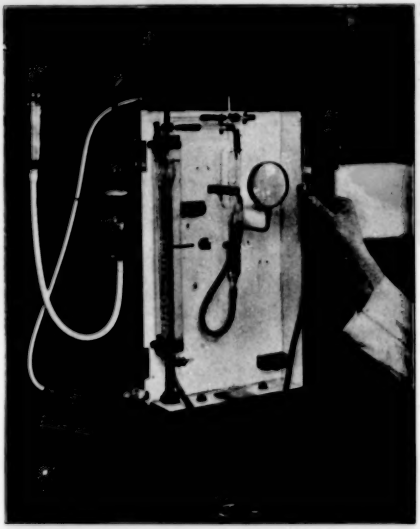


Fig. 4.—Buret containing sample to be analyzed connected with the graduated buret of Haldane's apparatus by means of an inverted capillary U-shaped tube. *G*, graduated scale (½ cm., divisions 0 to 25). The rubber bulb is connected with a glass tube reaching to bottom of large tube filled with water immersing burets; better shown in Figure 5.

rough preliminary estimation of the desired amount of air to be analyzed; (*b*) The placing of the vertical branches M and R (Fig. 5) in closer proximity than

as found in the instrument when bought. This greatly facilitates the adjustment of the levels in *M* and *R* as required before each reading. (*c*) The stationary magnifying lens gives greater accuracy and speed in leveling and leaves both hands free for other manipulations. (*d*) A fine horizontal line (*S*, Fig. 5) along the diameter of the stationary lens and another one at the same level directly on the background of the apparatus serves as a more accurate and convenient guide for bringing the meniscuses in *M* and *R* at a constant and definite level. A better control of the mercurial leveling cup is secured by resting the elbow on a block or any kind of support of a proper height to suit the operator. I omit mentioning other points of minor importance. Note, however, the stand on which the collecting tube is placed (Figs. 2 and 3) for the transfer of the sample into the buret. The mouth piece shown in Figure 1 is of metal (nickel-plated brass); the one shown in Figure 3 is of glass, which may not be used safely if the subject is liable to break it. The revolving rack with a capacity of twelve burets is a great convenience and economizes space.

The need of a simple apparatus for bedside use has been felt for some time. Fridericia has devised for this purpose an instrument remarkable for its simplicity and ease of operation.[16] This apparatus requires no collecting instruments as the subject delivers the air sample directly into the apparatus, which serves for the analysis as well. I have not had sufficient opportunity to give it a fair trial, but have no doubt that it can be recommended for clinical use.

I am not ready at this time to report on my own efforts to devise something which will meet the demand. I trust, however, to be able to report in the near future on an apparatus which promises to be satisfactory.

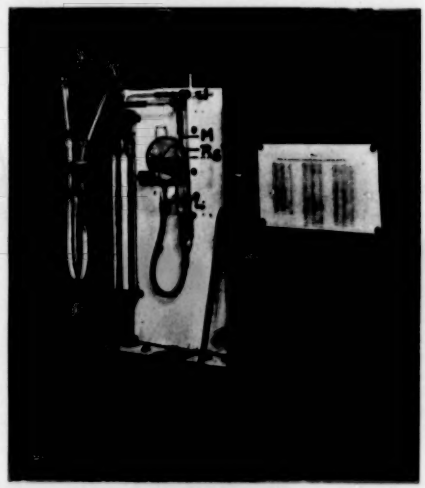


Fig. 5.—Position of stationary lens with fine transverse horizontal lines at level *S*. Note proximity of branches *M* and *R*, and block on which elbow rests when manipulating mercury leveling cup as shown in Figure 4.

16. Fridericia, L. S.: Eine klinische Methode zur Bestimmung der Kohlensauerspannung in der Lungenluft, Berl. klin. Wchnschr., 1914, No. 27.

CLINICAL OBSERVATIONS

Hasselbalch has shown that an increase in the irritability of the respiratory centers will induce a lowering of the carbon dioxid tension.[17] For practical clinical purposes, this should not detract from the reliability of the test, and all things considered, this factor would not lead one to error in following up the changes of carbon dioxid tension in individual cases. The results at any rate can be confirmed later by the urinary findings, which often require considerable time to obtain.

The Battle Creek Sanitarium has for over two years adopted the test as a routine measure in the management of diabetes, obesity and, more recently, in surgical cases. About two thousand determinations have been made, mostly in the above-mentioned groups of cases, but our experience has shown us the value of the test in many other affections, and points to the wide usefulness to which it seems to be destined.

The symptomatology of marked acidosis indicates plainly the serious character of its effects on the organism. It works insidiously but surely in its milder forms. In all conditions in which we have observed it, we find that the patient always improves remarkably when even a slight acidosis disappears. On the other hand, it aggravates concomitant affections and retards the progress of convalescence. As in diabetes, it interferes with nutrition and lowers vital resistance.

The power of endurance in health as in disease seems to run parallel with the individual power to retard or ward off acidosis. Observation along this line should throw considerable light on the causes of the greater endurance strikingly demonstrated in the vegetarian compared with that of the meat eater.[18]

Severe muscular exertion of even moderate duration will be followed by a decided fall of carbon dioxid

17. Hasselbalch: Neuttralitats-regulation und Reizbarkeit des Atemzentrums in ihren Wirkungen auf die Kohlensaurespannung des Blutes, Biochem. Ztschr., November, 1912.

18. Fisher, Irving: The Influence of Flesh Eating on Endurance, Yale Med. Jour., March, 1907.

TABLE 2.—ALVEOLAR CARBON DIOXID TENSION BEFORE AND AFTER A MARATHON RACE OF FIFTEEN MILES

August, 1913 No.	Subject	Alveolar Carbon Dioxid Tension			Food Served to the Runners During the Race
		Before Breakfast 8 a. m.	Before the Run 3:30 p. m.	After the Run 8 p. m.	
1	B	40	42	39	Ice, lemon, maltose caramels
2	K	44	—	40	Ice and lemon only
3	R	39	39	36	Ice, lemon, maltose caramels
4	J	36	38	—	Ice and lemon only

tension. If a resting period follows, the tension will gradually rise again. This rise will be rapid in the well nourished, whereas after prolonged abstention from food, and in conditions with acidosis, the rise will be slower or may not take place at all until food is partaken of again.

I have observed the behavior of four young men who entered a marathon race of 15 miles. The tabulated results show the following interesting facts:

1. The runners who showed the highest alveolar carbon dioxid tension before the race finished first.

2. Of the two who had the lowest tension, one finished last, while the other did not finish at all. This runner, furthermore, had the low tension of 36 mm. before breakfast on the day of the run. His tension rose after eating, however, and was 38 mm. just before the start.

All four were served at frequent intervals from two accompanying automobiles, water and small pieces of ice, and pieces of lemon. In addition, Nos. 1 and 3 only were frequently given maltose caramels.

I give these results as an illustration of similar ones obtained with various individuals, including some diabetics, after exercise of various degrees or after muscular work induced by the application of the sinusoidal current. A fall in the carbon dioxid tension, accompanied sometimes with the appearance, even in normal subjects, of acetone in the expired air, has always been noted.

SUMMARY

1. Acidosis is of frequent occurrence in a relatively large number of diseases.

2. Acidosis is detrimental in all degrees of intensity; therefore should be looked for, its degree estimated, and efforts to control or combat it should begin early.

3. The estimation of the carbon dioxid tension in alveolar air is as yet the simplest, quickest and most reliable practical method to determine the degree of acidosis.

4. Simpler methods and apparatus are needed. My simple method of collecting samples of alveolar air during unconsciousness as well as in all other conditions is described.

5. Clinical observations.

Cooks as Typhoid Carriers.—The *American Journal of Public Health*, discussing typhoid carriers employed as cooks suggests that steps be taken "to provide for the establishment of some system of registration, bacteriological examinations and certification of persons engaged as cooks and kitchen help in public institutions, hotels, restaurants, etc."

EMPYEMA OF FRONTAL AND ETHMOIDAL SINUSES

G. W. Stimson, A.B., M.D., Pittsburgh
Fellow of the American College of Surgeons; Rhinolaryngologist and Aurist, Tuberculosis League Hospital; Instructor of Laryngology, University of Pittsburgh, School of Medicine

Suppurating (empyema) frontal (and ethmoidal) sinusitis with fistula; radical frontal sinus (Killian) operation. Identical though independent condition six months later on opposite side.

Fig. 1.—Roentgenogram taken Dec. 3, 1914, before the first operation, showing a small left frontal sinus filled with pus, and the dehiscence of bone (indicated by arrow) leading into orbit; left ethmoidal and maxillary sinuses also positive. On the right is shown a large frontal sinus partially divided by a septum, clearly free from pus; ethmoids and antrum negative. Six months later these were all full of pus, with a fistula leading into orbit; an exact counterpart of the condition on the left.

The patient, a youth aged 16 years, referred by Dr. T. J. Moran, first consulted me, Dec. 3, 1914. There was nothing pertinent in either his family or previous medical history with the exception of his reference to his present condition. He stated that three years ago his left eye became swollen shut by a great swelling of both lids, due to what he thought was a "boil," which seemed to point above and internal to the inner canthus. At this point it was lanced by his physician and had persisted uninterruptedly ever since as a discharging fistula.

A rather remarkable fact in this connection is that during the past three years he had anxiously sought relief from numerous physicians and hospital clinics without result.

Examination revealed the fistula located as already described. It was of extremely small caliber and would not admit the smallest probe. But on practicing the Valsalva method of inflation (puffing the cheeks with lips and nostrils tightly closed), pus was readily forced out of the fistula. Anterior rhinoscopy revealed a greatly hypertrophied middle turbinal, the anterior half of which was balloon-like and boggy; the middle meatus was full of inspissated pus and crusts.

Fig. 2.—Photograph taken June 23, 1915, just three weeks after second operation. Only slight scar seen on left; on right side still some edema, which is gradually disappearing.

A roentgenogram by Dr. George C. Johnston revealed a dehiscence of bone at the inner edge of the left orbit (apparently on a level with the point of the fistulous opening through the skin) leading into the frontal and ethmoidal cells, both of which showed dense shadows (pus). The left maxillary sinus also was full of pus (probably acting as a reservoir), that is, it, too, gave a dense shadow.

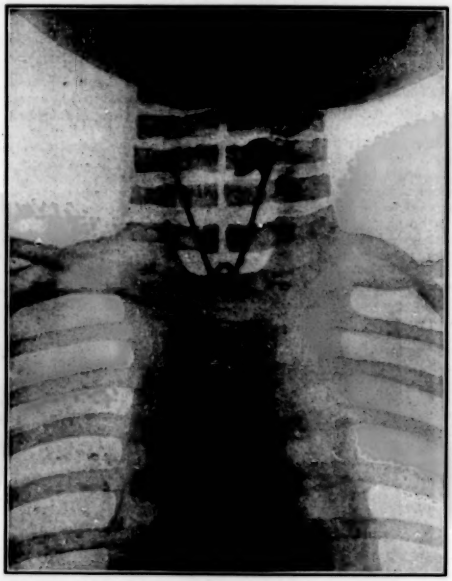
Dec. 7, 1914, under ether anesthesia, a typical radical frontal sinus (Killian) operation was performed. The incision reached from the temporal end of the unshaven eyebrow to the nasal end, and then curved downward through the fistulous opening, reaching almost to the left ala of the nose. After the orbital soft tissues (including the periosteum) had been well retracted, pus welled out of the wound, and 2 cm. behind the nasal end of the orbital ridge a fistulous opening the size of the end of a lead pencil was found leading into the ethmoidal cells, and a bent probe could be passed up into the frontal sinus. A bridge of bone 1 cm. in width, covered with periosteum, was left to support the brow, the anterior wall of the frontal sinus was removed above the bridge and the floor below, and a large opening made into the ethmoids. Through the nose the middle turbinal and some of the ethmoidal cells were removed *en masse*. An

opening the size of the end of a pencil was made through the external lateral wall of the nose (in the inferior meatus) into the maxillary antrum. A gauze drain was inserted, reaching from the frontal sinus above, down through the ethmoidal cells and the left side of the nose. The external wound was closed tightly without an external drainage (contrary to most textbook teaching). The gauze intranasal drain was removed at the end of forty-eight hours. The external stitches (metal clips) were removed on the fifth day. Union occurred by first intention. The bandage was removed entirely on the tenth day and the patient was discharged, free of his discharging fistula for the first time in over three years. As can be seen by inspection of the patient five months later, there is no depression and no deformity, and all that can be seen is a small linear scar reaching down the side of the nose from the nasal end of the eyebrow.

May 30, 1915, the patient presented himself again at my office with the opposite (right) eye swollen tightly shut by marked edema of both the upper and lower lids, and swelling especially marked internal to the inner canthus. The only symptoms were swelling of the eye and tenderness on pressure internal to the inner canthus.

Intranasal examination revealed absolutely nothing. Except for a slight tendency to atrophy, the right naris was normal, and there was nothing to cause one to suspect the existence of any abnormal condition of the sinuses. The middle turbinal was normal in all respects. There were no pus or crusts present in the middle meatus or elsewhere.

June 1, 1915, the patient was sent to the hospital, and June 2 a radical external operation (Killian) was performed. At first I suspected that the suppuration might have been an extension from the left side, through the septum separating the two frontal sinuses, but this proved not to be the case. The side of the original operation was healthy, quiescent and uninvolved. However, when the contents of the orbit were retracted, a dehiscence of bone was found (from which pus exuded) similar in size, location and all other respects to that on the other side. The disease evidently originated as an entirely independent process (empyema of ethmoidal and frontal sinuses) on the right side with no connection whatever with the left. Exactly the same operative procedure was employed, with the same gratifying results as regards both cure and cosmesis.



Safety pin in esophagus.

SAFETY PIN IN ESOPHAGUS OF YOUNG CHILD

G. S. OTRICH, M.D., BELLEVILLE, ILL.

E. Z., male child, 7 months old, of Hungarian parentage, was brought to my office by the mother, who had been referred to me by Dr. E. P. Rabb, both suspecting that the child had swallowed a safety pin. She had found the child, which she had left lying on its back, on its abdomen, red and choking. These symptoms soon subsided. On examination no bruises, ulcers or hemorrhage could be found. The throat appeared perfectly normal. When given water, the child swallowed with apparent ease. Careful palpation along the larynx and pharynx could neither elicit pain nor outline any foreign body. The child vomited soon after nursing. The mother was sent home with the request to make a thorough search for the pin. She returned at 3 p. m. and reported that no pin had been found. The child had slept one and a half hours, but invariably vomited after nursing. A roentgenogram was taken by Dr. C. P. Renner, which showed the relative position of the pin and the conditions we had to deal with in its extraction.

As it was impossible to use the esophagoscope, the Roentgen-ray tube was arranged beneath an ordinary table so as to throw the light upward, and the child placed so that the light from the target would be in a direct line and the fluoroscope was adjusted directly over the child. I then introduced a small snare, and by using my finger as a director, passed this into the esophagus. Then by intermittent flashing of the light, we could see the relative position of the snare-closing device and the pin. I passed the snare slightly beyond the pin and then gently withdrew it till the pin seemed to be engaged, then closed the snare and was very fortunate in being able to get it by this method on the first attempt. There was no trauma or hemorrage following the operation. The child made an uneventful recovery.

State Quinin Supply in Venezuela.—An Italian exchange reports that the president of Venezuela signed a decree last December which aims to render quinin available to all for treatment of malaria. The national board of health is given power over the sale of the drug. All public and private hospitals and dispensaries, the army, and wholesale and retail dealers in drugs are to be supplied at cost. The interior department of state has charge of the inspection of the quality and the distribution of the quinin.

Vascular Surgery.—In vascular surgery the men of the Middle Ages and of the Renaissance, Henri de Mondeville, Guy de Chauliac, and even Ambroise Paré, were blind followers, who never even approached the position of their masters. Not much more than a century has passed since men of the John Hunter type took up vascular surgery where Rufus and Antyllus had left it, and only to this generation of experimental surgeons, such as Eck, Ballance, Matas, J. B. Murphy, Halsted, Carrel and Guthrie, could the best of the Greeks go to school. You may think perhaps, that I am scarcely just to the great medieval surgeons, particularly to such a master as Ambroise Paré, who reintroduced the ligature, but in vascular surgery, the touchstone of the position of the art, they never wholly regained what the profession had lost.—Osler, *Lancet*, May, 1915.

New Instruments and Suggestions

A CLINICAL ELECTRICAL FIXING AND HOT STAINING APPARATUS*

H. J. Corper, M.D., Chicago

The need for a clean and neat apparatus for hot staining with carbolfuchsin has long been felt by laboratory workers in tuberculosis. With the advent of electricity and the use of nichrome wire for heating purposes, this want could be realized. Recently a good homemade "makeshift" electric

Clinical electrical fixing and hot staining apparatus.

hot staining apparatus was described by Carl L. A. Schmidt (The Journal, March 6, 1915, p. 823).

Since the opening of the Municipal Tuberculosis Sanitarium of the City of Chicago, there has been in use an electrical apparatus which is worthy of description, since it was found to possess manifold advantages over the older methods. By its use it was possible to fix the smears of sputum, etc., without danger of burning, stain them without danger of boiling the carbolfuchsin solution, and also avoid dropping carbolfuchsin all over the laboratory tables and floors. It was also possible to fix and stain as many as twenty or more without handling the individual slides within a short period of time.

The apparatus (a description of the twenty-slide type used by us is given), which can be made to accommodate any number of slides, multiples of two up to about twenty, consists of a large asbestos wood frame with base which will withstand a red heat without destruction. In the bottom of the boxlike frame is contained a sliding metal shelf to be filled with sand for catching any carbolfuchsin drippings and to aid in reflecting all the heat upward from the heating units, of which there are ten (one for every two slides). These units, which are easily replaceable, are simply made of "lavite" wound with nichrome wire (size 32), which will give the proper heat when connected with a 110-volt lighting circuit. (The nichrome wire used was tested for solubility in boiling carbolfuchsin solution and found to be insoluble.) In order to regulate this current more accurately, however, there is included in the circuit a small suitable rheostat. For the purpose of leveling the apparatus so that it may stand on any laboratory table, the two front legs of the base are made of adjustable leveling screws. The slide carriers are nickel plated brass frames made to fit in the asbestos frame at a suitable height above the electrical units, and with a handle at each end for moving it about, and suitable grooves so that the slides can be removed with forceps. When large numbers of slides are to be stained, three of these slide carriers are used, being placed in small trays made for the purpose. In this way it is possible to do continuous work as, for instance, fixing and staining one set while decolorizing, etc., the other sets. The trays can also be conveniently used in decolorizing and contrast staining by merely carrying to a nearby sink suitably arranged. A set of fuses is arranged on the apparatus so that there is no danger of accidental short circuit and burning of the operator. The apparatus is fireproof, being made entirely of metal and asbestos wood, as approved by the National Board of Fire Underwriters. This apparatus has been found to be a tremendous time saver by all who have used it in our laboratories.

The apparatus can be obtained complete (sizes two to twenty slides) from A. de Khotinsky, 6026 Drexel Avenue, Chicago.

* From the Laboratories of the Municipal Tuberculosis Sanitarium of the City of Chicago.

A UNIVERSAL SURGICAL MOTOR

H. M. Wegeforth, M.D., and Paul Wegeforth, M.D.,
San Diego, Calif.

The widely increasing work among surgeons in the treatment of bone lesions by direct methods has created a demand for motor-driven instruments, several of which are now on the market. All of these, however, aside from being very expensive, lack several essential qualities which we have tried, in a measure, to develop in the instrument described below.

The instrument consists of a 1/15 horse power motor connected with a driving shaft, 4 inches long, at the end of which is screwed a chuck for securing the surgical bits. Around these parts there is a snug fitting, detachable metal case permitting free and easy access to the motor mechanism. At the posterior end of the case there is fitted a permanent hollow

Fig. 1.—Universal surgical motor.

Fig. 2.—Universal surgical motor.

grip in which are stored the resistance coils and control mechanism. In addition to this grip, there is a detachable handle which can be fastened to the shell around the motor, and which can be adjusted instantly to conform with the position taken by the directing hand.

The instrument here described differs from those already on the market in the following details:

1. The entire motor, including bits and connecting cord, can be sterilized in the autoclave at a pressure of 15 pounds live steam for half an hour or more. There is nothing in the entire motor which can in the least degree be injured by heat.

Care should be taken, however, to dry the apparatus thoroughly after sterilization. This is easily accomplished in the autoclave, by the use of either a vacuum drying arrangement or the application of dry heat.

2. The chuck (*B*) at the end of the shaft fits any bit, having a diameter of its shaft up to ¼ inch. This does away with the necessity of obtaining specially designed drills for the instrument. As a matter of fact, most of the drills and burrs used by ourselves have been selected from a machinist's catalog, and were found to fit and be of service without alteration. As most of these tools are carried in stock by most hardware houses, the cost is quite small.

3. The outer shell, when removed, exposes the motor completely, allowing repairs to be easily made and permitting constant attention to be exercised over the working of the motor and connections.

4. The control (*A*), giving three speeds and a stop, is directly under the thumb of the operator and can be worked from any position. The speeds are 1,200, 1,800 and 4,500 revolutions per minute.

5. The pistol grip permanent handle (*D*) gives the operator a safe and sure grasp of the instrument in his major hand. As it is hollow, the room afforded on the inside gives a convenient place for the storage of the resistance coils.

6. A second grip (*C*) fits by means of a broad band over the larger part of the shell, and can be changed by a twist of the wrist to assume any position around the circumference, thus not only permitting of adjustment for various positions necessary during operations, but also allowing for use in both right and left handed individuals.

7. The weight of the entire instrument is 5¾ pounds and its length is 11¼ inches. It can be attached to any electric fixture supplied with either direct or alternating current.

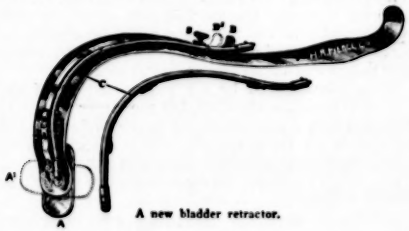
The instrument was made by the Southern Electrical Company of San Diego, Calif.

St. Joseph's Hospital.

A NEW BLADDER RETRACTOR

B. A. THOMAS, M.D., PHILADELPHIA

An ideal retractor in suprapubic cystotomy, particularly for exposure of the vesical trigon, does not exist. The chief difficulty has been to obtain a satisfactory exposure of the floor of the bladder and the ureteral orifices. Ordinarily two things occur to prevent this: First, when lateral retraction is made by simple vertical-bladed instruments, the floor and fundus of the viscus bulge up and down respectively, obscuring the ureteral orifices; second, the illumination of the operative field is either clumsy or insufficient.



A new bladder retractor.

The instrument here illustrated and described is essentially a Deaver retractor, or has the curve of this abdominal retractor, with certain important attachments which in my experience have made it most serviceable. The features of this new instrument are:

1. An adjustable cross-blade, *A*, which after introduction into the bladder by slight pressure at *B*, may be swung out as seen in *A'*. A set screw, *S*, fixes the blade in the horizontal position.

2. A removable light carrier, *C*, permitting the major part of the instrument to be sterilized by boiling; the lamp-carrier being conveniently sterilized in cold solution of liquor formaldehydi.

3. The lamp is particularly well constructed, sheds an excellent light and is very durable.

4. The instrument is thin, although very firm, therefore occupying very little space in the suprapubic opening and allowing unobstructed vision and opportunity for operative manipulations.

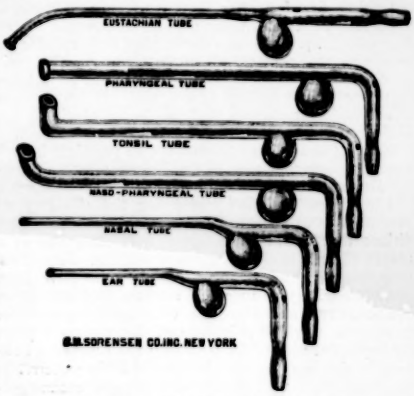
With two such retractors in lateral positions, one only necessarily equipped with the lighting device, and possibly a third simple Deaver retractor to hold up the upper angle of the wound and fundus, an operative field, par excellence, can readily be exposed.

116 South Nineteenth Street.

SUCTION TUBES FOR USE IN THE NOSE, THROAT OR EARS*

HAROLD HAYS, M.D., NEW YORK
Fellow of the American College of Surgeons

The tubes illustrated are designed for removing small amounts of secretions from the nose, throat or ears. They are made of glass and are fitted to a suction pump. Near the angle the glass is blown into a bulb into which the secretion will run. Just beyond the angle is a small hole so that even though the pump is turned on no suction is created until this hole is closed by the finger. In order to clean the tubes, water is run through them and then the excess of secretion is cleaned out by attaching the tube to the compressed air apparatus. If this does not succeed, one may start suction and thus draw water through them until they are perfectly clean. These tubes are readily boiled and are more durable than one would suppose.



Suction tubes for use in the nose, throat or ears.

11 West Eighty-First Street.

* Presented before the Otological Section of the New York Academy of Medicine, May 8, 1915.

Tuberculosis in Europe.—Tuberculosis statistics show that in Europe about 90 per cent. of all grown persons have been unable to defend themselves from tuberculous infection.—A. Calmette-Lille.

Special Article

PRACTICAL PHARMACOLOGY*

(Continued from page 333)

XXX

MISCELLANEOUS SOLUBLE SALTS

The systemic actions of a soluble salt are determined, as a rule, either by the anion alone or by the cation, but both ions are concerned in the actions of some salts.

Sodium and potassium are of physiologic importance but we know little of their actions that would indicate that one should be used therapeutically rather than the other in any given condition. It is often stated, however, that certain important differences are observed between the actions of sodium bromid and those of potassium bromid.

The rapid injection of large amounts of potassium salts directly into the circulation induces cardiac paralysis, but this action is not observed when the potassium salts are used therapeutically. It is sometimes maintained that the salts of ammonium or sodium should be used when cardiac depression from the action of potassium salts is to be feared.

Lithium is of neither therapeutic nor physiologic importance, but has become popular to a certain degree because of the erroneous belief that it is capable of dissolving uric acid calculi in the bladder. This misconception arises from the fact that salts of lithium do promote the solubility of uric acid and urates when tested under conditions that can never obtain in the bladder.

None of the salts of lithium are of sufficient importance to merit inclusion in the Council's list of "Useful Drugs."

The erroneous belief concerning the efficiency of lithium salts as solvents for uric acid has led to conditions that would be ludicrous were they not of a nature so little to our credit as physicians. Numerous proprietary preparations of lithium salts have been exploited widely as uric acid solvents and this action has been urged as the basis for their use in innumerable conditions in which it is claimed that uric acid plays an important rôle. The absurdity has reached its climax in the exploitation of so-called lithia waters. It has been shown that about two hundred thousand gallons of Buffalo Lithia Springs water contains an amount of lithium equal to only one therapeutic dose.

The rapid intravenous injection of large doses of ammonium salts causes strychnin-like convulsions, but these effects are never seen when those salts are administered by the mouth because they are decomposed in the body or eliminated almost as rapidly as they are absorbed. Hence after their oral administration their concentration in the blood never reaches the degree required to cause convulsions or hyperexcitability.

A fleeting stimulation of the central nervous system by ammonium is attained in the use of smelling salts in the treatment of fainting. Ammonium carbonate is frequently used to stimulate the respiratory center when this is depressed and when there is mechanical interference with respiration, as in asthma and especially in pneumonia. The use of ammonium acetate as a diaphoretic has been mentioned, the effect being attributed to its action on the central nervous system. The use of ammonium chlorid in the treatment of sore throat and cough has been mentioned in connection with other expectorants.

Calcium is an important element in the body, small amounts being found in the blood in which it is essential for the beat of the heart, and much larger amounts are found in the bones.

The normal diet probably contains more calcium than the body requires, but when calcium is withheld from the food of growing animals symptoms resembling those seen in rickets and osteomalacia are induced. This has led to the administration of calcium in the treatment of those conditions. It appears, however, that these conditions arise from an inability to utilize calcium, rather than from a deficiency of it in the food in most cases, hence calcium used therapeutically frequently fails to cause improvement. Emerich and Lowe believe that the daily food is often deficient in calcium and they recommend the routine use of as much as 1.5 gm. (22 grains) of calcium chlorid daily in health, and as much as 10 gm. (2½ drams) daily in disease. It is difficult to believe that such amounts are often indicated.

A diminution of calcium below normal in the circulation causes nervous irritability.

Such a depression of the central nervous system as is sometimes observed when magnesium salts are used subcutaneously in very large doses, as in the treatment of tetanus, can be relieved at once by the subcutaneous or intravenous injection of calcium chlorid.

Doses of from 0.30 to 0.40 gm. of calcium chlorid per kilogram of body-weight, corresponding to from 300 to 400 grains for a man, injected subcutaneously, gradually produce a fatal result in animals.

The intravenous injection of calcium salts into animals reduces their susceptibility to local irritants such as mustard, probably because of a lessened permeability of the smaller blood vessels. While normal dogs are resistant to the experimental induction of moist eczema their resistance is reduced by the injection of oxalates which precipitate the calcium in the circulation. It has thus been suggested that calcium salts should be used therapeutically in the treatment of moist eczema in man. It is also used on the same basis in the treatment of urticaria and to prevent serum rashes.

When administered by the mouth, a part of the salts of calcium are absorbed, but the larger portion is converted into insoluble phosphate or carbonate and excreted in the feces, the part that is absorbed being usually insufficient to exert any marked systemic effect.

The salts of calcium are administered to prevent or control hemorrhage during typhoid fever, and in hemophilia because of their supposed power to increase the coagulability of the blood.

Calcium chlorid will usually suffice for the administration of calcium, though there is no particular reason why one of the other salts should not be used if preferred for any reason. Calcium lactate has been recommended by many because of its being less irritant than the chlorid and therefore preferable for subcutaneous injection. Calcium hypophosphite is wholly superfluous and its use should be discouraged as it tends to perpetuate a mistaken idea of the value of the hypophosphites in general.

* This is the thirtieth of a series of articles on useful drugs — on practical pharmacology for the general practitioner. As soon as completed, these articles, elaborated by additional subjects, will be published in book form. The book, entitled "Pharmacology of Useful Drugs" will be ready about September 1st.

The average dose of calcium chlorid is 0.5 gm. (7½ grains). If larger doses are required to abolish the paralytic action of magnesium salts when such action is induced accidentally, small doses should be given subcutaneously and repeated if necessary, or a dilute solution (1:200) may be slowly injected intravenously until improvement occurs or until the full therapeutic dose has been administered. Concentrated solutions must not be injected subcutaneously as they cause abscesses. Calcium lactate may be given in doses of from 0.5 to 2 gm. (7½ to 30 grains).

Lime water, a solution of calcium hydroxid, is an antacid and has been used as a solvent for the false membrane of diphtheria, but it is not used to produce the systemic action of calcium.

Attempts have been made at various times to popularize the salts of strontium but these have no advantage over the corresponding salts of the alkalies and none of the strontium salts has been admitted to "Useful Drugs." *

THE BROMIDS

Animal experiments have failed to throw much light on the actions of the bromids on the central nervous system because of the comparatively slight action on the centers in animals unless doses are used that cause other toxic actions.

The bromids of the alkalies are irritant to the stomach and sometimes cause nausea and vomiting, especially when they are given in concentrated solutions or in the form of tablets. Tablets are convenient for dispensing but they should be dissolved in at least fifty times their weight of water before being taken.

The bromids cause mental depression with dulness and confusion of ideas, hence they are not so useful as hydrated chloral in simple wakefulness unattended with pain or nervous irritability, but they are useful in combination with hydrated chloral when these symptoms are present.

The bromids depress the centers in such a way that reflexes are diminished, while impulses passing from the brain to the periphery are said to be unaffected. They are therefore effective in controlling the reflex excitability of strychnin and may abolish the convulsions unless the dose of the strychnin has been excessive.

Large or frequently repeated doses of the bromids often give rise to a condition known as bromism, the readiness with which such symptoms develop in different individuals being subject to wide variation.

The symptoms of bromism include various skin eruptions, acne of the face being very common, and digestive disturbances which are sometimes attributed to the hydrobromic acid that is excreted into the stomach, but which are probably due largely to the local irritant action of the salt. The memory suffers severely and the other mental disturbances already mentioned are exaggerated. Muscular tremors also occur. The symptoms usually disappear if the drug is discontinued, but the patient is said to be more susceptible than normally to certain infectious diseases while suffering from bromism.

The bromids depress the respiratory center, and the sexual appetite is diminished or abolished.

The bromids are absorbed readily from the gastrointestinal tract and they may be detected in the urine within a few minutes after their administration. The larger part of the drug, however, is fixed in the tissues, apparently displacing as much as one fourth of the chlorids of the blood when saturation is said to have taken place, and the elimination thenceforth keeps pace with absorption. The bromid that displaces the chlorids in combination with protein is eliminated slowly, so that some weeks may elapse after the administration is discontinued before the last of the bromid is eliminated. Other tissues beside the blood also show the replacement of chlorids by bromids. Saturation with the bromids is reached more rapidly if chlorids are withheld while the bromids are being administered and, as saturation is desired when the bromids are used in the treatment of epilepsy, it is customary to limit the chlorid ingestion at such times. Saturation with bromids is indicated by the appearance of hydrobromic acid in the stomach, and probably by the elimination of a larger amount in the urine.

The mutual displacement of chlorids and bromids indicates the treatment of bromid poisoning by chlorids. It has been suggested that the toxic symptoms of the bromids may be due, at least in part, to the absence of the chlorids that are displaced, rather than to any direct action of the bromids themselves.

The bromids are found in nearly all of the body fluids and excretions, and bromism may be induced in a nursing infant whose mother is taking bromids.

THERAPEUTIC USES

The bromids are used as hypnotics when sleeplessness results from nervous irritability; they are frequently used with hydrated chloral, in which case their depression of the reflexes probably enhances the hypnotic action of the chloral.

They are especially useful in the treatment of epilepsy, in which they greatly diminish the number of seizures, or these may be abolished during the period that saturation with bromids is maintained. The attacks usually recur when the administration of the bromids is stopped.

The bromids are sometimes used for several days before operations on the throat and before examination with the mirror for adenoids.

They are also used to quiet nervous excitability in neurasthenia and in hysteria.

A more or less widespread belief exists that a mixture of bromids is preferable to any one of them, and the widely known epilepsy mixture of Brown-Séquard contained the bromids of sodium, potassium and ammonium together with some others. There is no evidence that such mixtures have any advantage over potassium alone.

Certain organic compounds of bromin have been introduced as hypnotics, but there is no satisfactory evidence that these are better than the inorganic.

DOSAGE

The average dose of sodium or potassium bromid is usually given as 1 gm. (15 grains), but 0.3 to 0.6 gm. (5 to 10 grains) is the dose commonly used as a hypnotic with hydrated chloral. In the treatment of epilepsy it is advisable to begin with doses of 1 gm. (15 grains) and increase until as much as 10 gm. (2½ drams) are taken daily, until saturation is attained or until symptoms of bromism indicate the limits of tolerance.

* Owing to lack of space the materia medica of several groups is omitted from THE JOURNAL. It will be included when this series is published in book form.

IODIDS

Our knowledge of the pharmacologic actions of the iodids does not permit of a systematic discussion of them as a basis for their therapeutic uses.

The systemic effects frequently observed after the administration of the iodids are commonly described under the term iodism, and these are often seen after small doses as well as after larger ones. It is even asserted that when they appear after small doses they may disappear if the dose is increased. This may be true but it has not been demonstrated satisfactorily that the disappearance in such cases is due to the increase in dosage.

Catarrh of the respiratory passages is probably the commonest of the symptoms of iodism. There is often swelling of the larynx with edema that interferes with respiration, occasionally necessitating tracheotomy, and rarely causing death. Bronchitis is not infrequent, and the eyes are commonly suffused.

The respiratory symptoms are sometimes attributed to the liberation of free iodin by minute amounts of nitrites in the saliva and by carbon dioxid. It seems improbable that enough iodin could be liberated in this way to give rise to the symptoms, for the larger part of a dose of iodid leaves the circulation promptly and the amount that can be detected in any of the tissues except the blood is extremely small.

Skin eruptions of the most various character occur more frequently after the drug has been administered for some time; these include erythematous patches, papular eruptions that may become pustular, eczema, bullae, pemphigus, purpura and many others. It is said that frequent bathing with scrupulous regard for the cleanliness of the skin lessens the severity of the skin manifestations.

The iodids of sodium and potassium are absorbed promptly from the gastro-intestinal tract. The larger portion is excreted rapidly in the urine unchanged, a portion remaining fixed in the tissues for some time, much as in the case of the bromids.

The excretion of the iodids in the urine begins within a few minutes, reaches its maximum in about two hours, and within twelve hours the greater part of a small dose is eliminated, but several days may be required for the practically complete elimination of a large dose. The elimination may be hastened by the administration of chlorids but not by simple diuretics, such as caffein. Small amounts of the iodids appear in the saliva and other secretions.

THERAPEUTIC USES

The iodids are used in combination with mercury in the treatment of the second stage of syphilis, and alone, or in combination with mercury in the third stage. Various explanations have been offered to account for the improvement that they induce, but no adequate explanation has been given of the truly remarkable effects that often follow their use in the treatment of syphilitic manifestations affecting internal organs. Other obscure manifestations of syphilis, such as neuralgia and disturbances of the central nervous system, often yield readily to iodid treatment.

They are extensively used in the treatment of chronic rheumatism, but the benefits they cause are unexplained. The effects of iodids on the thyroid, and indirectly on conditions affected through the thyroid, will be mentioned when the thyroid is discussed.

The iodids are frequently used in arteriosclerosis partly perhaps because of their supposed capacity for lowering arterial tension, but there is no satisfactory evidence that they lower blood pressure appreciably. Their usefulness in this condition as in aneurysm is probably limited to their capacity for causing the absorption of syphilitic deposits in the walls of the vessels.

These salts have long been of special repute in the treatment of chronic poisoning by lead and mercury, and while some old experiments seem to show that they facilitate the elimination of lead, and possibly of mercury, the mechanism of the action is not known.

The iodids are sometimes used in the treatment of asthma. It has been suggested that they paralyze the vagus endings in the bronchi, thus relieving the spasm. While large doses of the iodids do depress the vagus endings, it is hardly conceivable that the small doses usually employed can have any such action. They are commonly used with belladonna or some other member of the atropin group, compared to which they can act only feebly on the vagus.

The iodids are contraindicated in tuberculosis, but they are used, nevertheless, in syphilis complicating tuberculosis. The increased susceptibility of the tuberculous to the iodids should be remembered when they are used in such conditions.

They have long been used in the treatment of actinomycosis and they are also of especial value in sporotrichosis and blastomycosis. In all of these they promote the absorption of granulomatous lesions.

Numerous organic compounds of iodin have been introduced for use in place of the alkaline iodids. Although these lack certain disadvantages of potassium iodid clinical experience shows that they are weaker than potassium iodid in the doses commonly used.

These compounds of iodin with proteins and with fats seem to irritate the stomach less than potassium iodid. It is asserted that they induce symptoms of iodism less readily, but these claims have not been substantiated in cases in which they are used in amounts sufficient to produce the full therapeutic effects.

Numerous compounds of iodin with protein and others with nonprotein substances are described in New and Nonofficial Remedies.

DOSAGE

Potassium iodid is used in nonsyphilitic conditions in doses of 0.3 to 2.0 gm. (5 to 30 grains) but much larger doses are employed to promote the absorption of the gummatous exudates in tertiary syphilis, in which 5 gm. (75 grains) and even larger amounts are used unless symptoms of iodism appear.

It may be prescribed in doses of 0.3 c.c. (5 minims) of a saturated solution administered three times a day after meals (at which time the stomach contents lessen the irritation) with a daily increase of 1 drop in each dose. While a saturated solution is convenient for measuring the dose it should be remembered that saturated, or even somewhat less concentrated solutions of salts are irritant to the stomach, hence these should be diluted with from half a glass to a glass of water before being taken. Bland fluids, such as milk, are better than water, and even with such dilution they should be taken only after food.

When symptoms of iodism occur the drug should be discontinued for a time and smaller doses used when the administration is resumed.

MATERIA MEDICA

The iodids in general use are:

Potassii Iodidum.—Potassium Iodid, U. S. P.

It occurs as colorless or opaque white cubic crystals or a granular powder having a pungent saline, afterward bitter taste. The salt is slightly deliquescent in moist air. It is very soluble (1:0.7) in water and soluble (1:12) in alcohol.

Sodii Iodidum.—Sodium Iodid, U. S. P.

It occurs as colorless crystals of a white crystalline powder having a saline taste, practically devoid of bitterness. In moist air it deliquesces and frequently undergoes decomposition. It is very soluble (1:0.5) in water and freely soluble (1:3) in alcohol.

The alkali iodids like the bromids are incompatible with mineral acids, spirit of nitrous ether and oxidizing substances generally. They are also incompatible with bismuth salts and ferric salts, and should not be prescribed in solution with salts of alkaloids or with preparations of drugs having alkaloidal constituents.

The iodids are preferably prescribed in concentrated solutions that may be measured out in drop doses and directed to be taken well diluted with water or with such liquids as milk, or solutions of egg albumin. The following is a typical formula for securing a concentrated solution of an alkali iodid:

	gm. or c.c.	
℞ Potassii iodidi	25	1 ounce av.
Aquae destillatae.....q. s. ad	25	1 fl. ʒ

When larger doses of dilute solutions are used the disagreeable taste of the iodid may be masked by the addition of the compound syrup of sarsaparilla.

THYROID

The removal of the thyroid glands is rapidly fatal in dogs; in man it results in a train of symptoms closely resembling, if not identical with, those seen in myxedema. These include dulness of mentality and a characteristic collection of mucus-like substance in and about the connective tissue of the body.

The symptoms that result from the removal of the thyroid gland can be abolished by the oral administration of the dried gland or of a nonprotein compound containing iodin that may be obtained from the gland and which is probably secreted by it. This iodin compound as separated by Kendall contains 62 per cent. of iodin and is thought to be a di-iodo-dihydroxy-indole.

The oral administration of iodin or alkaline iodids may give rise to symptoms indicative of increased thyroid activity in those who show a tendency toward hyperthyroidism, or Graves' disease, and this would suggest that the activity of thyroid preparations might be increased by the addition of iodin or iodids to them, but this simple addition of iodin compounds to the thyroid preparations does not increase their activity. Such sophistication can be detected by chemical analysis, and biologic tests may be used to determine the activity of commercial preparations so that one can be satisfied that there has been no sophistication.

Four general methods have been followed in the investigation of the actions of thyroid preparations. These are: 1. The administration of thyroid substance to thyroidectomized animals. 2. The administration of the gland or preparations of it to patients suffering with myxedema. 3. Metabolism experiments during thyroid feeding. 4. Investigations of the effects of thyroid administration on the circulation.

The results of the oral administration of thyroid substance to thyroidectomized animals and man afford striking proof of the presence of some substance in the gland that is necessary to health, and the results obtained by the therapeutic use of the gland substance or idiothyrine in myxedema, in cretinism and in cases in which the gland has been removed have few parallels in the whole range of therapeutics. These brilliant results have led to the use of the gland substance in innumerable other conditions in which the failure is as complete as the success that attends its proper use.

Moderate doses of thyroid have comparatively little effect on normal persons, but with continued administration there is usually some loss of adipose tissue and some increased protein metabolism with loss of weight.

The action with reference to the increased metabolism of fat and protein is not the same in different individuals. In some there is a marked reduction of fat with relatively little loss of body protein, this being especially common in those persons who accumulate fat readily even when the diet is moderate and exercise is taken habitually.

When thyroid substance is taken for the reduction of fat an abundance of protein should be taken, but there is often a serious disturbance of the nervous system with marked destruction of body protein even when this precaution is observed.

The injurious effects of excessive thyroid feeding include palpitation with tachycardia and a sense of fulness in the head. There may be lassitude, trembling of the limbs, fever, sweating and sleeplessness. There is usually some looseness of the bowels or severe diarrhea; frequently there is some respiratory depression and there may be exophthalmos. These symptoms are seen in Graves' disease and are almost certainly due to hyperactivity of the gland.

Reid Hunt found that the administration of thyroid substance to mice increased their resistance to poisoning with isonitrile, the degree of the increase in resistance affording an index of the activity of the thyroid used. Unfortunately, we do not know the mechanism by which this tolerance is induced.

The injection of an extract of thyroid substance into the circulation causes slowing of the normal pulse rate, apparently through stimulation of the vagus center in the medulla, but with the appearance of toxic symptoms the vagus loses control of the heart rate and tachycardia results, as previously stated.

The thyroid glands of different species of animals, and even those of different members of the same species, vary widely in their iodin content and in their physiologic activity, but, as a rule, the iodin content of the gland lies between two and five parts in ten thousand of the gland.

The thyroid gland of the sheep is official in the U. S. Pharmacopeia VIII, but sheep are often goiterous, in which case the iodin content and the activity of the gland are low, and much of the older work done with thyroid substance is rendered valueless by the fact that the activity of the substance used is not known.

"New and Nonofficial Remedies" contains a description of a proprietary preparation known as iodo-

thyrine, or thyroiodin, which consists of a milk-sugar trituration of a substance, or mixture of substances, for which it is claimed that 1 gram of the preparation contains 0.3 mg. of iodin. This corresponds fairly well with the official dried thyroid gland.

THERAPEUTIC USES

The uses of thyroid gland have been suggested in part by the discussion that precedes this. First in importance in the use of thyroid stands its employment in those conditions in which there is a deficiency of normal thyroid activity, including myxedema, sporadic cretinism and patients having enlarged but feebly acting thyroid.

Of less importance, so far as real value is concerned, is its use in obesity though it is probable that it is used for this purpose more frequently than for any other, especially in the form of nostrums advertised directly to the public.

Curiously, its use in myxedema requires greater care than is necessary when it is administered to a normal person. It may then give rise to circulatory disturbances with weak and rapid heart, even when small doses are employed. The cause of these side actions is not known, but it has been suggested that during the course of myxedema and other conditions of deficient thyroid activity certain substances may accumulate in the organism and that these substances may be broken down, or otherwise rendered harmful, by the thyroid, in a manner analogous to the liberation of endotoxins when pathogenic bacteria are destroyed in large numbers in the body during the course of treatment of an infectious disease.

It is probable that the proper regulation of the diet and exercise can always accomplish better results than thyroid in the reduction of superfluous flesh.

The symptoms of thyroid poisoning should be borne in mind when one is called on to treat a patient who may be suspected of having resorted to the use of an obesity cure.

It would not be profitable to attempt to discuss the many different conditions in which thyroid has been used with asserted benefit.

DOSAGE

The average dose of desiccated thyroid gland is said to be 0.1 to 0.6 gm. (1½ to 10 grains), but it is evident that the dose must be adjusted carefully for each patient.

MATERIA MEDICA

The gland is official as:

Glandulae Thyroideae Siccae—Desiccated Thyroid Gland, U. S. P.

One part of the desiccated gland, in the form of a yellowish amorphous powder, represents approximately 5 parts of the fresh glands of the sheep. To insure greater uniformity it is proposed that the powder be required to yield from 0.17 to 0.23 per cent. of iodin in thyroid combination. The preparation is preferably administered in the form of capsules or cachets.

ANTITHYROID PREPARATIONS

These may be mentioned here briefly though their use is still in the experimental stage. A somewhat more extended discussion of these preparations will be found in "New and Nonofficial Remedies."

These preparations are obtained from the milk or blood of animals which have been deprived of their thyroid glands.

Their use is based on the theory that the thyroid secretes substances that are toxic but which neutralize, and are neutralized by, other toxic substances formed in the body. Removal of the thyroid is supposed to favor the accumulation of these toxic body substances (not those of the thyroid, of course) in the blood and milk, hence the blood and milk of such animals with the contained hypothetic accumulation are supposed to counteract the effects of hyperthyroidism (Graves' disease) or to interfere with the activity of the gland.

SUBSTANCES USED TO INFLUENCE THE APPETITE AND DIGESTION

BITTERS

Innumerable bitter drugs have been used with asserted benefit in the treatment of a great number of diseases though there is no satisfactory evidence that they are curative in any of these conditions, and it seems probable that the only benefit derived from their use is to be explained by the improvement in the appetite that they cause. The group of drugs known as simple bitters are now used by educated physicians only for improving the appetite.

That the appetite and digestion are closely related hardly required experimental demonstration, but Pawlow and his co-workers have shown that gastric juice is secreted when a dog is allowed to smell meat, but that food introduced into the stomach through a fistula might remain long undigested.

Bitter substances stimulate the taste buds in the tongue and cause the secretion of saliva, but Carlson and his associates have shown that they do not cause hunger contractions in the stomach, but on the contrary, that when they have any effect they tend to diminish these contractions. These experiments carried out on normal men and on one with a permanent gastric fistula of long standing, leave the question of the influence of the bitters on the appetite, as distinguished from hunger sensations, undecided.

Abundant clinical experience seems to show that the bitters taken shortly before meals improve the appetite in suitable cases. From this it follows that the subject is one for clinical, rather than purely pharmacologic discussion.

Bitters are classified conveniently as simple and aromatic. There are innumerable simple bitters, but the list of drugs in this class now recognized by the Pharmacopeia is much smaller than formerly and "Useful Drugs" contains only one—gentian—that may be classified as a simple bitter, since others, including nux vomica and cinchona, that may be used as such, have more important actions.

Chamomile, bitter orange peel and serpentaria are frequently added to alcoholic beverages or "bitters" in domestic practice, but none of these aromatic bitters has been included in "Useful Drugs."

Gentian is administered a few minutes before meals in such a way that the bitter taste is utilized, for, as previously stated, it has no therapeutic effect aside from this bitter taste.

DOSAGE

Gentian is rarely used in substance; the dose of the solid extract is 0.25 gm. (4 grains); that of the compound tincture is 4 c.c. (one teaspoonful).

AROMATIC CARMINATIVES

Under this classification are included various drugs that are related to other groups. Bastedo enumerates no less than eighteen therapeutic groups in which the carminatives may be classified. These include:

1. Anticolics, especially for infants (anise, ginger and peppermint).
2. Odors and flavors.
3. Correctives of irritant cathartics.
4. For tympanites—in typhoid fever, pneumonia, etc.
5. Anthelmintics (oil of chenopodium).
6. Stimulants of mucous membranes.
7. Antiseptics and anesthetics.
8. Counterirritants.
9. Stimulants in chronic skin diseases.
10. Stimulants to the growth of hair (oil of mace).
11. Antirheumatics (methyl salicylate).
12. Antihysterics (asafetida, camphor).
13. Antiasthmatics (cubebs in powder for cigarets).
14. Bronchial stimulants.
15. Diuretics.
16. Urinary antiseptics.
17. Emmenagogues.
18. Leprosy (oil of chaulmoogra).

Some of these have been discussed and a few remain to be considered.

The aromatic carminatives increase gastro-intestinal peristalsis and serve to hasten the passage of gas through the stomach and bowel. They induce hyperemia of the gastro-intestinal mucous membranes and probably increase the appetite and digestion.

Capsicum enjoys a special reputation in the treatment of atonic dyspepsia due to chronic alcoholism; cardamom is used as an aromatic carminative and the compound tincture is also used to give a handsome appearance to alcoholic mixtures. Oil of cloves is very commonly used for the relief of pain in carious teeth. Cinnamon is especially popular as a flavor. Mustard is most commonly used as a condiment; its use as a counterirritant has been mentioned. Ginger is probably the most popular member of the group for the relief of colic.

PEPSIN, PANCREATIN AND HYDROCHLORIC ACID

There are few chapters on therapeutics that reflect less credit on us than that dealing with the abuse of the digestive ferments. Many physicians have clung tenaciously to the idea that intestinal digestion can be promoted by the administration of pancreatin or mixtures of pepsin and pancreatin, despite the frequent reiteration of the fact that pepsin destroys pancreatin in the presence of a suitable acid.

Pepsin may be given to secure the digestion of protein food in the stomach when there is a deficiency of pepsin in the gastric secretion, but this seldom occurs, pepsin being secreted even where there is a deficiency of hydrochloric acid in the stomach.

Pepsin acts only in acid mediums and its action is inhibited when the concentration of hydrochloric acid exceeds 0.3 per cent. It is destroyed rapidly by pancreatin in alkaline mediums.

Pepsin is used in acute indigestion when there is no absence of hydrochloric acid in the gastric secretion but in chronic conditions it should be used only when it has been shown that pepsin and hydrochloric acid are both deficient in the gastric secretion.

Pancreatin is not often suited for oral administration for the reasons just mentioned, and it is useful mainly for preparing partially digested protein and starchy foods.

It may be administered with sodium bicarbonate in achylia gastrica, and it has been administered in the form of pills coated with salol or in gelatin capsules that have been hardened in formaldehyd, but this method of administration is not very promising.

Milk may be partially peptonized by adding a small amount of pancreatin and bicarbonate of sodium and allowing it to stand for a few minutes at body temperature. The process may be stopped by heating the milk rapidly to 65 C. (150 F.). If the process is carried too far the taste becomes excessively bitter.

As previously stated, there is a deficiency of hydrochloric acid in the gastric secretion more frequently than of pepsin. It is commonly given in doses of 1 c.c. (15 minims) of the diluted acid with water.

COD LIVER OIL

Cod-liver oil may be considered in this place, though it is not a drug, its value depending on its nutrient property.

The taste is so disagreeable to most persons that it is commonly dispensed in the form of a sweetened and flavored emulsion.

Cod-liver oil has long enjoyed a special reputation in the treatment of tuberculosis. Practically all proprietary emulsions of cod-liver oil contain the useless and extremely disagreeable tasting hypophosphites.

The following formulas may be used by those who prefer to prescribe the emulsion of cod-liver oil without useless salts:

	gm. or c.c.	
Cod liver oil	250	℥ viii
Acacia	60	ʒ ii
Syrup	60	℥ ii
Methyl salicylate	2	♏ xxx
Water, q. s. ad	500	℥ xvi

The flavoring may be varied to suit the individual taste; oil of sassafras, oil of peppermint, oil of cinnamon or oil of bitter almond may be used in varying quantities. In the event that oil of bitter almond is used that without hydrocyanic acid should be specified.

An emulsion made with yolk of egg has had considerable vogue at times and may be made as follows:

	gm. or c.c.	
Cod liver oil	250	℥ viii
Fresh yolk of eggs	45	ʒ jss
Glycerin	60	ʒ ii
Syrup	60	℥ ii
Methyl salicylate	2	♏ xxx
Water, a sufficient quantity to make	500	℥ xvi

In making this emulsion the yolk of eggs is triturated in a mortar with the glycerin added gradually. The oil is then added to this mixture, small portions at a time, followed by the syrup, the flavoring and finally a sufficient amount of water to make the required quantity.

(To be continued)

Exercise in Pregnancy.—The expectant mother should take exercise in her customary way, and to her usual extent, provided that no violent exercise such as jumping, jolting or straining is permissible. A daily walk in the open air does much toward keeping one in a cheerful frame of mind. Routine household duties are usually helpful except in an overworked person.—Dr. Bibb, Leaflets for Patients.

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SATURDAY, JULY 31, 1915

VON PETTENKOFER AND HALF A CENTURY OF HYGIENE

Half a century has elapsed since the appointment of Max von Pettenkofer as the first professor of hygiene in any university, and the establishment of the first institute for the study of hygiene, at the University of Munich, in 1865. The subject of hygiene is now familiar, not only among physicians, in connection with the establishment of schools of hygiene attached to the medical departments of many of our universities and leading to special degrees or diplomas, but also in popular discussions of the public health. One may forget, therefore, that the beginnings of this modern scientific discipline, in the broader sense in which it is now understood, belong within the memory of many still living.

It would be unfair to contend that there was no interest in the questions here involved prior to von Pettenkofer's time.[1] In England the same science was being developed under the name of "public health"; and Great Britain's especial contribution to hygiene in the last century was in connection with the development of local organizations concerned with the control of all matters relating to the health of the communities involved. Ford remarks that the years 1847, when medical officers of health were first appointed; 1848, when they were required to be qualified medical practitioners (public health act); 1855, when every vestry and district board in London was required to appoint one or more medical officers of health, and 1872, when the new public health act forced every sanitary authority outside of London to appoint a medical officer of health, formed the especial landmarks in this chronological development. Turning to France, in 1848, the year that saw the first public health act of Great Britain, the Conseil d'état passed an ordinance for general health regulation. In these earlier days the attention to the subject of hygiene in America was sporadic and limited at best.

1. Many of the facts cited here are taken from a paper by W. W. Ford on The Present Status and the Future of Hygiene or Public Health in America, read at the May meeting of the Association of American Physicians, Science, 1915, xlii, 1.

Most physicians will agree with Ford that von Pettenkofer was really the founder of modern hygiene, at least so far as the German-speaking races were concerned. He occupies, indeed, the same position in regard to hygiene that Virchow does in pathology. The radical movement in hygiene fathered by him made a profound impression on Europe, especially on Germany and Austria. Professorships were established in the leading medical schools, first in Bavaria and then in other parts of the German empire; thoroughly trained men were put in charge of the administration of sanitary laws, and an attempt was made to limit the spread of the infectious diseases by scientific methods. The new knowledge acquired by von Pettenkofer and his pupils, and the laws promulgated at their suggestion soon began to have a definite influence on the mortality returns.

In its essence as applied to principles relating to the maintenance and promotion of health, the word "hygiene" dates back even before the days of Galen; it formed a contrast to the "iatric" pursuits which involved the healing art. About the middle of the nineteenth century, the idea of collecting all experiences dealing with the preservation of human health began to find expression. Von Pettenkofer inaugurated a new epoch by recognizing, in far larger measure than had previously been recognized, that health is impaired by factors which are to be sought not within ourselves, but in our environment. He realized the necessity of establishing the pursuit of the cause of disease on an independent scientific basis, with the aid which the physics, chemistry and physiology of his day could afford. The field of hygiene was made to include not only the study of epidemics, but also the problems of nutrition, clothing, ventilation and related themes.

There are some who still identify hygiene with the less comprehensive though eminently important science of bacteriology. This is a narrow view. Special emphasis may properly be laid on the mode of transmission of the infectious diseases; but the fundamental principles of hygiene should also apply to vital statistics, heating, lighting, ventilation, clothing, disinfection, sanitation, water and milk supplies, sewage disposal, nutrition and food values. It was von Pettenkofer who established hygiene on this broad and firm basis, and inaugurated what has rightly been termed "one of the most important movements in the science of medicine of the nineteenth century."

The retrospect which the semicentennial anniversary of the first hygienic institute in Europe awakens may appropriately be accompanied by anticipations of the future development in the dissemination of a knowledge of health problems. Where shall the advance be carried first? If possible, Ford writes,[1] let us first educate our medical students, then our officers of health, then the public. Should the order be changed,

however, no great harm will result. Should this country be so fortunate, he adds, as to see schools of hygiene attached to the medical departments of our universities properly endowed and aiming to satisfy all three needs, then, indeed, shall we be fortunate beyond the wildest dreams of the most enthusiastic student of the subject.

PSYCHOLOGY AND ART OF THE CAVE MAN

The assumptions with regard to the cave man's interests, and the belief that our primal ancestor was occupied exclusively with the struggle for existence have been so commonly accepted, that facts which completely contradict these theories are of interest. Professor MacCurdy[1] of Yale has written recently concerning some discoveries of works of art left by paleolithic man on the walls and floors of caverns in the Pyrenees. A report concerning these objects has recently been made to the French Institute. The caves in the Pyrenees have in recent years yielded a series of art objects which illustrate forcibly how high was the artistic ability of the cave dwellers. The remains of the art of these men are among the earliest documents available in human history. For a generation paleontologists have been familiar with portable Quaternary art objects, carved tools, weapons and the like, and also with engraved pebbles and carved fragments of stone, bone, ivory and horn. But it is only during the last few years that the fact has been recognized that stationary art, that is, wall and ceiling decoration of various kinds, is even more important than the examples of portable art, though these proved a veritable revelation of the artistic sense of their makers.

The most recent finds were made last year, during the weeks immediately preceding the beginning of the war. Count Begouen who, with his three sons, explored the Caverne des Trois Frères, named for the three brothers, reported to the French Institute that numerous prehistoric remains were encountered. The three younger explorers were called to the colors to fight for their country, and therefore could no longer continue their investigation of the art work of the earliest men of whom we have any records. Abortive as was this first investigation, the results of the preliminary visits were of such a nature as to foretell an abundant harvest when the work shall have been resumed.

The chief display of art was on the walls, where more than two hundred "admirably engraved" figures of animals are to be seen. The following species have already been identified: the mammoth, often seen in these cave-men pictures and evidently a contemporaneous inhabitant of the land with the artists; the rhinoceros, the first found in the caverns of the Pyrenees, and then the bear, lion, wolf, deer, reindeer, wild goat, horse, bison, chamois, eel and bird. There are also some anthropomorphic figures, including a curious female type drawn in black. It is thought that this might represent a human figure wearing a mask; the creature seems to be walking almost on all fours with the head surmounted by a reindeer horn.

The mural art of the Caverne des Trois Frères is executed with thorough artistic effectiveness. MacCurdy declares that it is admirably done. A small panel with reindeer at rest evidently enjoying themselves is, according to the French explorer, "like a page from an album." From the standpoint of the engravings, this cavern is "certainly the richest and the most beautiful thus far known." It confirms previous impressions that the oldest of European men, who lived thousands of years ago, had an artistic vision and a power of reproducing his vision that would have made him an artist of distinction at any time in the world's history.

The colors used by these Quaternary artists are insoluble in water and are mainly composed of the oxids of iron and manganese. These minerals were pulverized, mixed with grease or other medium and applied with a brush. It was a form, therefore, of oil painting, and the brushes were made of animal bristles and hair. Their crayons were whittled from chunks of ocher or manganese oxid. The artist's tools were primitive, yet effective. Flint scrapers and engravers were employed in preparing the surface and tracing the outlines. Portions of wall were often selected for the pictures which, because of their contour, gave the effect of colored bas-relief. Curiously enough, just after the discovery of colors, there was a period of paintings in the caverns characterized by an excessive use of color, thus weakening the effect of the modeling. Man had improved his materials so much that, as at many subsequent periods of human history, he came to depend on them for effect instead of his own efforts in an artistic way. Fortunately, there came a subsequent stage in the development of paleolithic painting when it reached its zenith, and some of the frescoes were remarkable for vigor, realism and the command of colors displayed, which were graduated into numerous shades and tints.

Some of the pictures made by these cave men seem marvelous in their artistic quality. A bison at bay and a charging boar are models of the most faithful reproduction of intense activity. In the bison at bay there is a tension about all the muscles which indicates the absolute readiness of the animal to charge, and that suppression of action which artists often find so hard to express with anything like satisfactory effectiveness. In the charging boar, every muscle in the creature is in action, and the effect produced is most vivid. Modern artists have not hesitated to say that

1. MacCurdy, G. G.: The Cavern of the Three Brothers (Ariège), Science, May 28, 1915, p. 782.

there are few artists in our time who could have expressed animal action so finely. Others have said that the creators of some of these portraits would be admitted at once into associations of artists in our time with a recognition of the fact that here was a brother artist spirit.

These paintings were probably made not less than 10,000 years ago; good authorities do not hesitate to declare that they must be at least 25,000 or 30,000 years old, and some have not stopped at the claim of an antiquity of 100,000 years. Apparently man's power to see with absolute clarity all the essential elements of a picture, involving even complex action, and the ability to reproduce it, have not changed in such a period.

THE PRESERVATION OF LIVING BLOOD CELLS

The red blood cells have of late acquired an unanticipated importance as a staple, so to speak, in the stock of supplies of the medical laboratory. They are an essential reagent in the technic of certain tests such as the Wassermann reaction; they form a highly desirable component of fluids used in blood transfusion. The blood corpuscles are currently regarded as fragile in nature and extremely prone to disintegration outside of the body. It is known, indeed, that even within the circulation the life of these formed elements is a limited one; at any rate it is assumed that they are undergoing disintegration steadily in the blood stream because they furnish hemoglobin, the mother substance of the bile pigments which are being excreted continually. An approximate calculation of the number of red corpuscles destroyed daily in the body has suggested a yield of one tenth of the total hemoglobin.[1] On this basis, the total duration of life of a red corpuscle in the circulation could not exceed ten days. Other estimates, however, place the length of life at several weeks.

It is not always easy to procure erythrocytes of a desired sort to meet sudden exigencies; therefore it would present a great advantage if they could be preserved both morphologically and functionally intact for some time outside of the body. Usually incipient hemolysis soon shows that the preservation of the blood cells in vitro is of brief duration even in their own serum. Weil[2] has recently reported that if blood is mixed in suitable proportions with sodium citrate so that it does not clot, it may be kept for many days in a refrigerator without losing its oxygenating function. After a week the red cells show little change under the microscope, and very slight reduction in their resistance to toxic physical or biologic agencies. Weil has demonstrated that animals may be practically exsanguinated and then restored rapidly by transfusion of such citrated blood even if it is several days old. No unpleasant reactions have been observed, and human patients have already been treated in the same way with citrated blood in amounts ranging from 10 to 350 cubic centimeters. Injections of blood from three to five days old are reported to be perfectly well borne and to produce no apparent disturbance of any kind except a transient rise of temperature and polyuria.

The advantages of suitable procedures for keeping red blood cells "on tap," so to speak, are obvious; it is quite natural, therefore, that much effort should be expended in the preservation in vitro of living erythrocytes. At the laboratories of the Rockefeller Institute for Medical Research, Rous and Turner have shown that in citrated plasma or defibrinated blood the erythrocytes of many species begin to break down within a week or ten days; and washed erythrocytes in normal salt solution or Ringer's fluid do not last even so long. This early hemolysis of washed erythrocytes is attributable in large part to injury during washing. It can be prevented by the presence of a very little gelatin in the wash fluid (0.125 per cent.). But even when protected during washing, the erythrocytes do not remain intact in vitro nearly so long as they are supposed to in the circulation.

Rous and Turner[3] have directed their attention to the discovery of agencies which will not only protect, but also preserve the corpuscles to a degree that does not happen when gelatin or citrated plasma or any of the familiar isotonic fluids are employed. They have found the sugars well suited to this purpose. In a dextrose-Ringer's mixture containing 2.5 per cent. of dextrose, the erythrocytes of the sheep have been kept intact for a period of two months, and those of man for a month in a somewhat similar solution. The limits of the method have not yet been reached. The sugars which have proved best are saccharose and glucose. Isotonic mixtures are better than hypertonic. For the blood of each species a different preservative solution is required. Thus, the blood of the dog keeps best in a sugar-Ringer's-dextrin mixture, whereas for other bloods, dextrin is useless if not harmful. It is interesting that though sugars and dextrin are preservative they are not protective; red cells handled in solutions of them undergo as much injury as in ordinary Ringer's solution.

The fact that cells can be kept intact in the way here described, that they can replace freshly drawn cells in the Wassermann test, that they can be washed repeatedly and will take up and give off oxygen in a typical manner, is not a sufficient proof of their viability. This could be determined only by transfusion trials. In the experience of Rous and Turner on ani-

1. Howell, W. H.: Textbook of Physiology, Ed. 5, Philadelphia, 1913, p. 430.

2. Weil, Richard: Sodium Citrate in the Transfusion of Blood, THE JOURNAL A. M. A., Jan. 30, 1915, p. 425.

3. Rous, Peyton, and Turner, J. R.: On the Preservation in Vitro of Living Erythrocytes, Proc. Soc. Exper. Biol. and Med., 1915, xii, 122.

mals, bile has never been found in the urine after the transfusions, nor hemoglobin with any certainty. There is no rise in temperature, and immediately after the operation the transfused animals are lively and seem quite normal. The outcome of these newest investigations[2] leaves the impression that washed erythrocytes left in a sugar-Ringer's mixture are really preserved alive, and preserved better than in plain Ringer's or in plasma-Ringer's-citrate. Such beginnings lead one to look forward to a time not far distant when the preservation of "surviving blood" like that of surviving tissues and organs may find a beneficent application in practice.

THE SUCCESSFUL DESTRUCTION OF FLY LARVAE IN HORSE MANURE

Ever since the slogan "Swat the fly" was liberated on the American public, the hygienic danger of the house fly has been thoroughly understood by persons in almost all walks of life. The injunction to destroy all evident specimens of this insect species has been heeded far and wide. In thousands of homes the fly is no longer tolerated. The logical solution of the fly problem resides, however, in the elimination of all breeding places or the destruction of the eggs and maggots before they can develop into an adult age.

Horse manure, which forms the principal breeding place of the house fly, has a large value as a fertilizer. It is not difficult to find a larvicide which will be effective; but to be suitable it must destroy the larvae of the fly without killing the bacteria of the manure. The latter are essential for the proper conversion of the manure into products which have value as plant food. Arsenical dip is an effective larvicide, but its poisonous nature precludes its use in any general way. Other products such as anilin, pyridin and nitrobenzene have been found to give satisfactory larvicide results, but the cost precludes their use.

Last year the U. S. Department of Agriculture demonstrated that borax is an effective larvicide, obtainable throughout the country, and available for the successful treatment of manure at the cost of 0.42 cent per bushel.[1] However, inasmuch as large quantities of manure are used in some forms of modern intensive truck farming, a warning was issued with reference to the possible injurious action of applications of borax-treated manure on plants. Meanwhile the government scientists have continued the pursuit of some volatile or other organic larvicide which would be effective, yet entirely devoid of possible toxic action on vegetation. As a result, powdered hellebore (from *Veratrum album* and *Veratrum viride*) has been found to be an excellent larvicide without exerting a deleterious action on the fertilizing value of the manure as determined by bacteriologic and chemical analyses, and no injurious action has been detected in the field tests.[2] The cost of the treatment, which calls for one-half pound of powdered hellebore to 10 gallons of water applied to 8 bushels of manure, is 0.69 cent per bushel. Without rejecting the usefulness of borax, unless it is applied in undue amounts through carelessness, the government experts now give preference to the hellebore. No injury can arise from the use of even excessive quantities, for the substance is entirely destroyed in the course of the fermentation of the manure. Sanitarians everywhere will welcome this useful discovery and contribution to the antifly campaign.

1. Cook, F. C.; Hutchison, R. H., and Scales, F. M.: Experiments on the Destruction of Fly Larvae in Horse Manure, Bull. 118, U. S. Dept. Agric., 1914 (Bureau of Entomology).

RICE POWDERS AND FACE POWDERS

The toilet powder commonly known as "rice powder"—often labeled "Poudre de Riz" or "Fleur de Riz"—seldom is what its name declares, according to Charles H. La Wall,[3] chemist to the dairy and food commissioner of Pennsylvania. Out of sixteen samples of so-called rice powder examined by him, only two consisted entirely of rice (unfortunately La Wall does not name the brands), and only six contained any rice at all. Talc, corn starch, zinc oxid, chalk and bismuth subnitrate were the substances found replacing rice flour wholly or in part.

La Wall's attention was first directed toward substitutions and adulterations by a case in which a physician had difficulty in establishing a diagnosis. A face powder, alleged to consist of rice flour, fell under suspicion, and was found to contain zinc oxid, talc and corn starch, but no rice. The zinc oxid proved to be the disturbing factor. La Wall cites several cases observed by oculists—invariably in women—of blurred vision, inability to use the eyes long at a time, and severe itching of the lids.

Seven cases were originally reported in THE JOURNAL by Black.[4] On microscopic examination of the secretion removed from the eyes, the symptoms were found to be due to the presence of crystals in a "rice" face powder[5] used by a number of patients. These crystals were discovered in the face powder, but could not be found in true samples of "rice" powder. The powder, when applied with a puff, is driven upward and lodges on the moist eyeball. In the presence of tears it becomes mucilaginous in character, and, lodging in the culdesac, produces the symptoms complained of.

The substitution of other ingredients for rice in so-called rice powder constitutes a fraud, since sales-

2. Cook, F. C.; Hutchison, R. H., and Scales, F. M.: Further Experiments in the Destruction of Fly Larvae in Horse Manure, Bull. 245, U. S. Dept. Agric., July 20, 1915.
3. La Wall, Charles H.: Am. Jour. Pharm., July, 1915.
4. Black, N. M.: Face-Powder Conjunctivitis, Correspondence, THE JOURNAL A. M. A., April 18, 1914, p. 1274.
5. Roger and Gallet.

people assert and customers believe that rice powder is — rice powder. This deception seems to be due, however, to trade custom rather than to deliberate fraudulent intent. Rice flour costs at wholesale only 6 cents a pound; talc costs the same; chalk is 5 cents a pound; corn starch is 3½ and zinc oxid is 2 cents a pound. Bismuth subnitrate is $2.75 a pound, but this may be disregarded, as it was present only to the amount of 1 per cent. in two samples. The difference in the cost of these ingredients is therefore insufficient as an inducement for adulteration, in the case of an article costing 6 cents wholesale and from 40 cents to $1 a pound retail. Since foodstuffs are sold under the provisions of the federal and state food and drugs acts, while toilet articles are not, La Wall suggests that consumers might well avoid adulterations and at the same time make a saving, by purchasing rice flour at a grocery.

THE CONTROL OF TRAFFIC SEWAGE

The art of sewage treatment is a recent one, and its development is as yet comparatively rudimentary. It seems reasonable to believe that, as time passes, the field of waste sanitation will become more and more comprehensive, and that many conditions now tolerated will eventually be regarded as obviously intolerable. One phase of waste sanitation which seems to be arousing attention is the treatment of sewage from such public conveyances as fresh water steamers and railway coaches. Some significant features of this problem were recently considered by L. C. Frank of the United States Public Health Service, in a paper on "The Control of Traffic Sewage."

The problem of traffic sewage control is at present being investigated by the Public Health Service and by the International Joint Commission. Naturally the public interests require the prompt and effective removal of any dangers arising from traffic sewage. Naturally, also, the traffic interests desire that it be reasonably demonstrated that the dangers adduced are real, and that the prescribed remedy be practicable, efficient, and not unreasonable in cost. Both of these demands are reasonable and just. It is probably safe to assume that, in the main, the traffic interests are viewing the question broadmindedly, and are willing to apply any corrective measure which may be shown to be reasonably necessary and economically possible.

The danger from the noncontrol of sewage from fresh-water vessels lies in the relation between such noncontrolled discharge, the drinking-water supplies of other vessels, and the drinking-water supplies of communities whose intakes lie within the bacterial zone of influence of the traffic lanes. Along crowded traffic lanes between busy ports, steamers often follow one another very closely, and it is hardly possible to doubt that the drinking-water intake of one steamer may thus often be exposed to pollution in local zones of discharge from another steamer. Again, these crowded traffic lanes pass close by a number of major city water intakes, thus creating an obviously dangerous situation.

The need for controlling sewage discharge from railway coaches arises from the possibility of pollution by the train sewage of drinking-water supplies within the zone of bacterial influence of the railway roadbeds. This zone of bacterial influence is determined by two factors: surface drainage and wind action. Surface drainage is an important factor because particular attention is paid in modern railway roadbed construction to rapid drainage. Typhoid feces, even though exposed to the sun and air for days, can hardly be considered as free from danger, and rain water which washes over them and then drains away very rapidly to the nearest watercourse must constitute a decided danger to the drinking-water supply. Again, wind action may be a factor in determining the zone of bacterial influence of the roadbed, because some drinking-water reservoirs, which may not be affected by surface drainage from the railway roadbed, may nevertheless be within the radius of the carrying capacity of the wind. Bits of dried fecal matter or particles of earth impregnated with fecal matter or urine may at any time be blown into such reservoirs. The existence of such dangers is recognized by such preventive measures as the locking of water-closet doors while steamers or trains are in danger zones.

Six methods of dealing with the situation are considered:

1. Purification of that part of the affected water supplies which is actually used for drinking water instead of any attempt to control the sewage.
2. Locking of all toilet doors while steamers and trains are within danger zones.
3. Storage of the sewage in tanks during passage over danger zones, and discharge after the danger zone is passed.
4. Treatment of the contents of storage tanks with chemical disinfectants before discharge.
5. Treatment of the contents of storage tanks with steam before discharge by manual operation.
6. Equipment of storage tanks with apparatus for the automatic disinfection and discharge of the sewage, when it has reached a certain predetermined level in the tank, by means of steam or other heating element.

Of all these methods the sixth is decidedly the best. The first would be apt to impose a very unjust burden on the users of the affected water supplies. The average number of travelers on the Great Lakes every day during the season of 1906 was 117,000, whereas the number of persons whose water supplies are affected by the 117,000 travelers can be shown to be many more than 4,000,000. Manifestly, it would be unfair for 117,000 persons to place the burden of water purification on 4,000,000 persons. The other methods are

open to the objection that their success depends on manual operation by a large number of employees. It is almost axiomatic that the greater the number of employees to whose care is entrusted the execution of a certain duty, the greater the likelihood that infractions will occur, unless such infractions automatically create their own remedy. The fourth method is also open to the objection that ordinary chemical disinfection loses much of its efficiency when it is called on to treat liquids containing such solids as fecal matter. It is extremely difficult—in fact, well nigh impossible—to secure thorough penetration into the interior of the particles.

A tank has been designed by the Public Health Service[1] to meet the requirements of the sixth method. This tank and the method which it embodies have a number of advantages. It depends for its disinfection efficiency on heat, which is generally acknowledged to be very thorough in its action, readily penetrating organic particles. The action of the tank is entirely automatic. If fresh sewage enters the device while it is being discharged, the discharge immediately ceases. Water closet doors may remain unlocked on boats over drinking-water areas, and on trains while waiting in stations, a convenience that would gladden every traveler.

This device is now being experimented with on a stationary basis in order to secure the maximum simplification of details and long-time data on steam consumption and bacterial efficiency. As soon as these experiments are completed the device will be tested in actual service to determine the effect of rocking and of variable outside temperatures.

Rough preliminary estimates indicate that, for a railway coach which uses 10 cubic feet of water per day for flushing closets, disinfection with the device described will cost two cents per day. For steamers the cost is greater, since the amount of water used for flushing closets is more generous in the present practice. An estimate is made of five or ten cents per closet per day. Steamers may reduce this by substituting railway closets for the present equipment.

1. Sewage Disinfection for Vessels and Railway Coaches, U. S. Pub. Health Rep., Jan. 1, 1915.

Deaths from Automobile Accidents.—During May thirty persons, fourteen of them children under 16, were killed by automobiles in the streets of New York City, as reported by the National Highway Protective Society. As set forth in the New York *Tribune*, not one of the thirty drivers concerned in the killings was indicted. The Weekly Bulletin of the Department of Health, in commenting on this, asks whether the legislature of the state is not guilty in this matter, and calls attention to the fact that the Health Department, though it might do much to prevent such accidents, is handicapped, as are all other authoritative bodies, by the action of the legislature not only in providing for the licensing of drivers of cars, but in expressly forbidding any local authority from enacting protecting regulations. Protective legislation is asked from the state, or in the absence of that, that the hands of local legislative bodies be untied so that protection may be afforded.

Current Comment

THE EASTLAND DISASTER

The *Eastland* disaster is one more illustration of the cheapness of human life. A thousand happy people about to start on a picnic—for most of them the event of the year—met sudden death. It was a preventable death, but the dead could not have prevented it; they were innocent of danger. True, their outing included a trip on Lake Michigan, and there is sometimes danger on the water in stormy weather. But that morning the lake was quiet; so there was no warning to the careful and the timid. Yet in a moment a thousand lives were sacrificed. Sacrificed to what? Man's inhumanity to man! Somewhere lies the blame. As we go to press, investigations by authoritative bodies are being made; until these are concluded and the findings announced, it is unwise to hazard a guess as to where or on whom the blame rests. Certain facts, however, seem to stand out as incontrovertible: A vessel of evil reputation—a "crank"—was purchased by one group of exploiters, perhaps because it could be had at bargain rates; was subleased to another corporation; was subleased to still another body for a single trip; and was then filled beyond capacity.

THE SHAPE OF HUMAN RED BLOOD CORPUSCLES

The familiar statement that the red blood corpuscles of man and other mammals are biconcave circular disks has been challenged in recent years by a number of capable morphologists, including Weidenreich, Lewis and others. They have taught that the classic definition of the erythrocytes should be altered to describe them as bell-shaped corpuscles without nuclei. The details of the controversies that have centered in these distinctions are perhaps too technical and subtle for general interest. It will not be denied that cup-shaped corpuscles can be observed in preparations of blood. The decision between the biconcave disk shape and the cup shape merely resolves itself into a solution of the question as to which is the normal, which the derived form of the mammalian corpuscle. Dr. H. E. Jordan,[1] of the Department of Anatomy at the University of Virginia, is the latest to join those who maintain that the uninjured, unmodified erythrocytes are clearly circular biconcave disks. By extremely careful preparation of microscopic specimens in solutions of presumably excellent preservative qualities, this normal form is invariably obtained. Jordan remarks that if a freely moving corpuscle is watched for some time, it may be seen to turn upward, now one side, now the opposite side, in either case showing a central depression. Viewed obliquely, such a biconcave disk gives the deceptive appearance of a shallow cup. This optical illusion may account for a certain amount of misinterpretation. The vast majority of the corpuscles remain unaltered at room temperature dur-

1. Jordan, H. E.: The Shape of the Human Red Blood Corpuscle, Proc. Soc. Exper. Biol. and Med., 1915, xii, 167.

ing the period of observation. Cup forms appear most abundantly, according to Jordan, in ordinary preparations with Ringer's solution when the cover glass is supported by a hair. The explanation that immediately suggests itself is that the floating disks become altered into cups through adjustment to the narrow confines between slide and cover glass. In other words, a cup form is conceived of as a circular biconcave disk which has become pushed out on one or the other of its concave surfaces. If these views are substantiated, it would appear that pressure is the chief factor in the production of cup forms through narrowing the confines to which the delicate disks are compelled to adjust themselves.

PUBLICITY IN LEGISLATION

The most valuable reformatory force is publicity. Those who are actuated by unworthy or selfish motives object to having their acts made public. One of the evils connected with legislation has been the ignorance, on the part of the voter, as to the position of his representative on important measures. The public has a notoriously short memory, and often the politician has been able by smooth phrases and glib generalities to explain away his record. In one state at least, however, members of the state legislature will have to stand on their record, at least so far as public health bills are concerned. In a recent issue of the *Ohio State Medical Journal* appears a tabulation of the vote of all members of the state legislature on six important public health measures before that body during its last session. A glance shows how any member stood on any particular measure. As the facts tabulated are taken from the official record of the house and senate, they cannot be disputed, while the right of the voter to know how his representative has stood on any measure is beyond question. The more the people know about their representatives, the better the chances of good government.

THE BLOOD AS A SOURCE OF AMMONIA

Those who are familiar with the modern advances in the chemistry of metabolism have seen frequently the mention of ammonia in connection with a variety of physiologic and pathologic processes. Ammonia is involved in the neutralization of the acids in excess of bases in certain conditions sometimes spoken of as acidosis. It is regarded as a stage in the denitrogenizing of proteins, formed when the nitrogenous groups are liberated from the amino-acids which enter into metabolism. Ammonia may be absorbed as a product of putrefactive changes in the large intestine and thereby reach the circulation. As a precursor of urea, it is reputed to play a significant rôle in the organism. There is, then, no lack of ways in which ammonia can enter the blood, in which it can always be detected. Less familiar, however, is the fact that ammonia arises spontaneously in blood even under aseptic conditions. For this reason the accurate determination of this component of the blood, which composes part of the now frequently estimated nonprotein nitrogen of the body fluids, is beset with difficulties. This evolution of ammonia is much greater than the preformed ammonia present in the strictly fresh blood.[1] In a search for its source, Dr. Alice Rohde[2] has attempted to ascertain whether or not, with aseptic measures, the formation of ammonia occurs in diffusible constituents of the blood after their separation from the nondiffusible constituents according to the vividiffusion method of Abel and his collaborators.[3] The outcome of her experiments indicates clearly that, in the dialysate obtained from circulating blood, there is no liberation of ammonia comparable to that which takes place in shed blood under aseptic conditions. The source of the slowly liberated ammonia is, therefore, to be sought in the nondialyzable constituents of the circulating medium.

IS THE PHYSICIAN AN "EASY MARK"?

Some time ago THE JOURNAL called attention[4] to a scheme being worked on physicians under the name of the American Medical Index Association. It was reported to be conducted by a C. A. Beck. The first complaints came from Indianapolis; later the concern opened an office in New Orleans,[5] and after securing a number of subscriptions — at $10 each — departed, leaving many physicians unsatisfied creditors. After this, the affair was heard of at various places, as has been noted from time to time in THE JOURNAL. A few days ago a Detroit physician wired THE JOURNAL that a "Dr." Beck was in that city endeavoring to start a scheme for supplying abstracts and indexes of current medical literature to physicians. On receipt of THE JOURNAL'S reply, Mr. Beck was arrested. As he appears to be wanted in many cities, it is a question where he will be tried first. In one of our former comments[6] on this scheme of working doctors, we asked the question, "Is the physician an easy mark?" We may now answer — Not always!

DIURNAL VARIATIONS IN ARTERIAL BLOOD PRESSURE

The recording of body temperature in man has been a routine practice on the part of physicians for so many years that the details of experience are familiar. The clinical study of blood pressure is rapidly approaching a comparable degree of familiarity and perfection. The blood pressure gage has taken its place side by side with the thermometer and the stethoscope in the "pocket outfit" or the office desk equipment of every practitioner. Nevertheless it may, perhaps, not yet be a gratuitous task to record new data

1. Folin, O., and Denis, W.: New Methods for the Determination of Total Non-Protein Nitrogen, Urea, and Ammonia in Blood, Jour. Biol. Chem., 1912, xi, 512.
2. Rohde, Alice: Vividiffusion Experiments on the Ammonia of the Circulating Blood, Proc. Nat. Acad. Sc., 1915, i, 357; Jour. Biol. Chem., 1915, xxi, 325.
3. Abel, J. J.; Rowntree, L. J., and Turner, B. B.: On the Removal of Diffusible Substances from the Circulating Blood of Living Animals, Jour. Pharmacol. and Exper. Therap., 1914, v, 275, 611.
4. A Warning, Medical News, THE JOURNAL A. M. A., Feb. 6, 1915, p. 522.
5. Bogus Index Association Operating Among Physicians, Medical News, THE JOURNAL A. M. A., March 20, 1915, p. 1008.
6. Is the Physician an "Easy Mark"? editorial, THE JOURNAL A. M. A., April 10, 1915, p. 1247.

on healthy man; for the technic of observation has not yet been mastered in perfect fashion by every one who attempts to measure arterial pressure, and the normal variables are not yet widely appreciated. Accordingly, we quote the outcome of a series of observations on diurnal blood pressure made in the physiologic laboratory of Boston University on healthy students under studied conditions designed to afford dependable results.[1] A rise of maximum pressure averaging 8 mm. of mercury occurs immediately on the ingestion of food. A gradual fall then takes place until the beginning of the next meal. There is also a slight general rise of the maximum pressure during the day. The average maximum blood pressure for healthy young men in the neighborhood of 20 years of age is 120 mm. of mercury. This pressure obtains commonly one hour after meals. The higher maximum pressures occur immediately after meals, and the lower, as a rule, immediately before meals. The range of maximum pressure varies considerably in different individuals, but the highest and lowest maximum pressures are practically equidistant from the average pressure of any one individual. The minimum blood pressure is very uniform throughout the day, and is little affected by the ingestion and digestion of meals. When it is affected, a rise or a fall may take place. There is a tendency for a slight general lowering of the minimum pressure throughout the day. The average minimum blood pressure for healthy young men in the neighborhood of 20 years of age is 85 mm. of mercury. Thus we get an average pulse pressure of 35 mm. of mercury. Pulse pressure, pulse rate and the relative velocity of the blood flow are increased immediately on the ingestion of meals. They attain the maximum, as a rule, in half an hour, and then decline slowly until the next meal. There is a general increase in each throughout the day. The average pulse rate in these investigations proved to be 72 beats per minute.

THE MEDICAL BROTHERHOOD

On another page[2] is the announcement of the organization and membership of a new body — the Medical Brotherhood for the Furtherance of International Morality. Without knowing more of the object of this organization, or of the functions it will assume, it is impossible to comment on it extensively. Without doubt, however, the motives which have prompted the formation of this organization are of the highest. Whether these motives are too utopian or too idealistic to be accomplished practically time alone can tell. Certainly the conception of the organization is in trend with the thought that is in the minds of all who regard science, and medical science especially, as having neither national nor racial boundaries; so far as medical science is concerned, universal and continual peace is practicable.

1. Weysee, A. W., and Lutz, B. R.: Diurnal Variations in Arterial Blood Pressure, Am. Jour. Physiol., 1915, xxxvii, 330. A bibliography of the subject is appended to this paper.

2. Organization of Medical Brotherhood, Miscellany, THE JOURNAL A. M. A., this issue, p. 451.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Advisory Board Appointed.—The following physicians have been appointed members of the City Health Department of Sacramento: Dr. Andrew M. Henderson, president; Dr. William K. Lindsay, secretary; and Drs. Eugene H. Pitts and Samuel J. Wells.

Tuberculosis Hospital Ready.—The new tuberculosis sanatorium for Fresno County, erected at a cost of $12,600, was opened to receive patients, July 18. The building consists of the main structure and two wings and will accommodate fifty patients. Dr. John D. Morgan is superintendent of the institution.

Billings to Give Lane Lectures.—The next course of Lane medical lectures will be given at the medical department of Leland Stanford Jr. University, San Francisco, on the evenings of the week of September 20-25, by Dr. Frank Billings of Chicago on "Focal Infection." Dr. Billings has also agreed to give some clinical demonstrations.

Medical School Merged.—It is reported that the Hahnemann Medical College of the Pacific, San Francisco, has conveyed its property to the University of California and will cease separate instruction. Two professorships will, however, be maintained at the University of California School of Medicine, one in homeopathic medicine and the other in homeopathic therapeutics, these subjects being offered as elective courses.

Personal.—Dr. James L. Maupin has been elected president of the Fresno City Board of Health, succeeding Dr. Warden T. Barr, resigned.——Dr. Burt F. Howard, Sacramento, head of the tuberculosis department of the State Board of Health for two years, has resigned, to take effect August 1, and will practice in Sacramento.——Dr. Frank M. Lawson, Willow, has been appointed health officer and physician of Glenn County.——Dr. August Fehlen, San Francisco, suffered painful bruises in a collision between automobiles, June 29.——Dr. Byron P. Stookey, Los Angeles, has started for Europe with the intention of serving in Serbia.——Drs. Walter B. Coffey, Samuel J. Gardner and James H. O'Connor have leased the entire fourth floor of the Physicians Building, San Francisco, for a term of years.

ILLINOIS

Honor to Physicians.—Memorial portraits of the late Drs. Justus Townsend and Charles Ryan, who were members of the staff of St. John's Hospital, Springfield, for many years, have been presented to the hospital by the visiting staff and will be hung in the new reception room.

Administration of Sanatorium Approved.—The administration of the Oak Forest Tuberculosis Sanatorium has been formally approved by the advisory committee which consists of Drs. Theodore B. Sachs, Ethan A. Gray, Stephen R. Pietrowicz and Mr. James Minnick. At present the staff consists of eight physicians and fifty-six nurses and there are 586 patients in the institution.

Typhoid Fever.—The presence of forty-five cases of typhoid fever in Oak Park has caused the commissioner of health of Chicago to send Dr. Heman Spalding, head of the contagious department of the bureau of health, to Oak Park to cooperate with Dr. C. St. Clair Drake, secretary of the State Board of Health, who has taken charge of affairs there.—— As twenty-five cases of typhoid fever have developed at Harvey, between July 13 and 23, the authorities appealed for help to the State Board of Health and Dr. C. E. Crawford has been sent to take charge of the situation.

Report of Tuberculosis Institute.—The Evanston Tuberculosis Institute, in its report for the year, states that the dispensary has been open on Monday and Thursday afternoons, from 3 to 4; that Drs. Stephen V. Balderston and Herman P. Harder are the physicians in charge of dispensary patients; that the medical control of the dispensary has been placed in the hands of the Evanston branch of the Chicago Medical Society which appointed a medical dispensary committee consisting of Drs. George W. Boot, Dwight F. Clark

and Mary G. McEwan, which has the medical control of the dispensary under its care.

Personal.—Dr. Clarence M. Cheadle, Rockford, has offered his services to the Serbian government to aid in the work against epidemic diseases and sailed from New York, July 19. ——Dr. William S. Pickard has been appointed health officer of Maywood, succeeding Dr. Mary McK. Harper, resigned. ——Dr. J. F. Vannice, Bishop Hill, had a slight cerebral hemorrhage, July 10.——Dr. Frank F. Gardner, Granite City, who has been actively at work in the war zone since October last, has returned home.——Dr. Frank C. Winters, Monmouth, is suffering from an infected wound of the hand and is under treatment in Augustana Hospital, Chicago.——Dr. J. H. Alpers, Rantoul, who was stricken with cerebral hemorrhage, July 3, is reported to be improving.——Dr. Clyde A. Finley, Galesburg, who was operated on in the Galesburg Hospital, recently, is convalescent and has returned home. ——Dr. Egbert K. Dimmitt, Farmington, who has been under treatment in the Proctor Hospital, Peoria, is reported to be convalescent.——Dr. Francis M. Roberts has been elected president of the village board of trustees of Chapin.——Dr. Benjamin F. Gallant, Kankakee, has been appointed assistant superintendent of the Charity Hospital, New Orleans, and assumed his new duties July 22.

Chicago

Personal.—Dr. Cassius C. Rogers has severed his connection with, and discontinued his clinic at the Frances Willard Hospital.——Dr. Hugo E. Betz has been appointed superintendent of the Iroquois Memorial Hospital, succeeding Dr. F. Patrick Machler.

Open-Door Policy Approved.—At the concluding session of the alienists and neurologists, July 16, endorsement was given to the open-door policy at the Psychopathic Hospital, as advocated by Dr. John Dill Robertson, health commissioner. By this, mental defectives may be taken to institutions without being subjected to police or court action.

Baby Welfare Week.—Infant welfare week was inaugurated by a meeting in the city council chambers, Thursday, July 15. Mr. Teter, president of the Infant Welfare Society, said there were now twenty-one infant welfare stations in Chicago, but that fifty were needed. The appropriation to the health department for infant welfare purposes was small and an appeal was made by Mr. Teter and by the commissioner of health for contributions to the cause.

Clean Bill for City Sanatorium.—The trustees of the Municipal Tuberculosis Sanatorium, after a thorough investigation, report that the charges of extravagance at the institution are groundless. It was shown by the figures that the cost per patient for April and June averaged about $12.50 a week. In April there were 314 patients at the institution, in June the number was increased to 445, and a month later 609 patients were under treatment. It is estimated that when the institution is completed and filled to its capacity of 950 patients, the cost per patient per week will be reduced to $10.

IOWA

Personal.—Drs. Henry E. Meyer, Belmond, and Walter K. Long, Hampton, have been appointed members of the medical staff of the new Lutheran Hospital, Hampton.——Dr. Charles B. Burk, Atlantic, has been elected vice president of the Southwestern Iowa Medical Society.——Dr. William S. Norton, Muscatine, dislocated his right wrist while cranking his motor car, July 10.

Contract for Buildings at Epileptic Colony Awarded.—The contract for the construction of buildings for the State Epileptic Colony, Woodward, was awarded by the State Board of Control, July 15, to a Minneapolis firm for $230,602. This contract provides for a group of thirteen buildings, ten of which are known as the hospital group, the other three being the power house, service and laundry buildings.

KANSAS

Medical Service as Memorial.—In memory of their son Robert, Dr. and Mrs. Frank Warner, Bonner Springs, have arranged a free medical service for the poor of that place during the months of July and August. The service is in the hands of Dr. Fred D. Candler, Bonner Springs, who will treat free of charge, any person in the city unable to pay for treatment and special care and a room, if necessary, will be provided.

MARYLAND

Joint Laboratory.—A cooperative laboratory in which Garrett and Allegany counties and the city of Cumberland will participate has been established in the department of health laboratory in the Cumberland City Hall. The laboratory will be in charge of a trained pathologist and bacteriologist.

United States Warned of War Diseases.—The great danger of importing to America cholera, typhus fever, the plague and other diseases from war-ridden Europe was pointed out in a communication from Dr. James A. Nydegger, Baltimore, U. S. P. H. S., who is now in London. Dr. Nydegger is interested in the campaign now being carried on in England by the National League for Physical Education and improvement to prevent the spread of epidemics by insects during the war.

Typhus in Baltimore.—According to a bulletin issued by Health Commissioner Nathan R. Gorter, a patient with typhus has just recovered in a Baltimore hospital. The case was diagnosed comparatively early by the hospital men and investigated by the Health Department and the United States Public Health Service. The bulletin, it is stated, is to acquaint physicians of the fact and put them in a position to recognize typhus and to be able to report cases promptly, should they occur, so that the department may be able to control the disease.

Personal.—Dr. Winford H. Smith, superintendent of the Johns Hopkins Hospital, has gone to Maine for his vacation, and during his absence Dr. Karl H. Van Norman, first assistant superintendent, will be in charge.——Dr. James A. O'Donnell, a Baltimore physician, was thrown from his buggy on July 22, when his horse bolted after a collision between the buggy and a wagon which ran into the doctor. Dr. O'Donnell's back was badly strained.——An oil painting of the late Dr. J. Brown Baxley, painted by L. P. Deitrich, will be hung shortly in the Baltimore General Dispensary, Paca and Fayette Streets.——Dr. David C. Streett, Baltimore, was operated on in St. Agnes' Hospital for disease of the intestines, July 6.

Social Exhibit at Hopkins.—By an arrangement with the trustees of Johns Hopkins University, the Baltimore exhibit on social and charitable work in the city and state has been installed in McCoy Hall and will remain on public view until September. It consists of thirty-seven panels and half a dozen ingenious devices. The entire exhibit is divided into six sections, including infant mortality, medical inspection of schools, mental defectives, tuberculosis among negroes, social needs at Locust Point and the social survey. There is also a special section on child labor. The special reason for displaying the exhibit is to bring it to the attention of those who are attending the summer school classes and the still larger number of persons who come for the general lectures which are held every week.

MICHIGAN

Hospital Opened.—One unit of the new Ford Hospital, Detroit, was opened last week. It is devoted exclusively to the treatment of victims of the alcohol and drug habit.

Tuberculosis Day.—The governor of Michigan has issued a proclamation setting apart August 20, as Tuberculosis Day, and requesting that all physicians in the state, on that day, make free examination of any patient believed to be suffering from tuberculosis.

New Tuberculosis Hospital.—A residence west of the State Smallpox Hospital on Lansing Avenue, Jackson, has been purchased and is being fitted up as a tuberculosis sanatorium. The building will accommodate fifteen patients and will be ready this month.

Leprosy.—The finding of a case of leprosy at Ann Arbor, July 13 has aroused considerable discussion concerning the disease. At the clinic of the Tristate Medical Society's meeting at Ann Arbor, Prof. Udo J. Wile made a plea for the better treatment of lepers and deprecated the abhorrence of the laity for a leper.

Report of State Health Officer.—In his annual report to Governor Ferris, the secretary of the State Board of Health, Dr. John L. Burkart, Lansing, mentions especially the propaganda of the board which has been a great success, calls attention to the failure of the state legislature to provide sufficient funds to carry on the department and notes that the circulation of the health bulletin has increased 2,500 during the year.

Personal.—Dr. Ralph C. Apted, city physician of Grand Rapids, who has been seriously ill at Butterworth Hospital, is gaining rapidly and has been removed to his home.——Dr. William A. Wilson, superintendent of the Florence Crittenton Home, Detroit, has been elected president of the Michigan Child Welfare Conference.——Dr. Athanase E. Gourdeau, Ishpeming, has gone to Chicago for treatment on account of disease of the throat.——Dr. Walter T. Parker, Corunna, was painfully injured in the overturning of his automobile near Owosso, July 8.——Dr. John F. Cardwell has been placed in charge of the Nose and Throat Clinic of the Grand Rapids Antituberculosis Society.——Dr. Arthur J. Carlson has been appointed full-time health officer of Escanaba.——Dr. Robert M. Gubbins, Battle Creek, was operated on for the removal of gallstones at the Battle Creek Sanatorium, July 18, and is reported to be doing well.

MISSISSIPPI

Personal.—Dr. Henry B. Powell has been elected a director and president of the Ocean Springs Country Club.——Dr. William B. Lewis, Bay St. Louis, has succeeded Dr. W. H. Moody as health officer of Hancock County.——Dr. Walter S. Leathers, University, director of the Educational Campaign on Sanitation, is said to have declined an offer to be made chief of the vital statistics division in Washington.

Pellagra.—In a bulletin recently issued by the Mississippi State Board of Health, it is said that 10,954 cases of pellagra were reported to that body in 1914 by county health officers. In 1913 there were 6,991. Though a portion of this increase is thought to be due to better reporting, it is believed that the disease is rapidly increasing in the state. There were 1,192 deaths in 1914 from this disease, as compared with 795 for 1913, although the number of deaths from all causes was about the same in the two years. The death rate for 1914 was said to be 62.7 per 100,000, as against 42.4 for 1913, an increase of over 47 per cent. The pellagra mortality based on the number of deaths from all causes was 10.9 per cent. It is recommended in the bulletin that the dietetic theory of the U. S. Public Health Service as to the etiology of pellagra be accepted and treatment carried out along the lines suggested by the service.

MISSOURI

Medical College Closed.—It is reported that the Kansas City Hahnemann Medical College has been discontinued.

Hospital Dedicated.—St. Elizabeth's Hospital, Hannibal, was dedicated July 8. The building is four stories high, has been erected at a cost of about $60,000, and is owned by the Sisters of St. Francis.

The Medical Laboratory in St. Joseph.—In the canvass for funds for the establishment and support of the medical laboratory of the Missouri Foundation in St. Joseph, an endeavor is being made to secure $25,000 for the establishment and equipment of the laboratory and a fund of at least $200,000 for its endowment.

Clinics for Negroes.—Two new clinics for colored patients have been opened by Dr. Paul Paquin, health commissioner of Kansas City. Each will be in charge of a colored physician and nurse, and at each station modified milk will be furnished at cost. One of these stations is at Troost and Independence Avenue and the other on Vine near Twenty-Third.

Personal.—Dr. Walter S. Sutton, Kansas City, has returned after five months spent as chief surgeon of the Mrs. Harry Payne Whitney Red Cross Hospital, Juilly, France.——Dr. Floyd E. Martin, Excelsior Springs, has been appointed a member of the staff of the Fulton State Hospital, succeeding Dr. W. F. Shaw.——Dr. and Mrs. George R. Stevenson and family, St. Joseph, started on an automobile trip to the Pacific Coast, July 3.——Dr. James M. Potts, city physician of Springfield, was thrown from his buggy, June 28, and painfully injured.

St. Louis

Personal.—Dr. C. A. Heckleman of the staff of Barnes Hospital is said to be critically ill as the result of persistent exposure to the Roentgen rays.——Dr. William C. Bradley has been appointed assistant surgeon to the United Physicians Company.——Dr. Richard H. McBaine is reported to be critically ill with septicemia at Barnes Hospital.

St. Louis Unit Organized.—The St. Louis University recently authorized the formation of a hospital unit to be known by its name for service in the European war. The organization is now complete and waiting call to service. It consists of thirty-two physicians and seventy-five nurses. Dr. William T. Coughlin is in charge of the unit.

Expedition to Tropics.—Dr. Edward Nelson Tobey, assistant bacteriologist; John P. Coony, professor of chemistry, and Rev. A. M. Schwitalla, professor of geology in St. Louis University, sailed from New Orleans, July 22, for British Honduras and Guatemala where they will study diseases, poison and insects peculiar to that part of the tropics, and gather material for further scientific investigation in the university laboratories.

MONTANA

Improvements at State Institutions.—The state of Montana will spend $80,000 on improvements on the Warm Springs Asylum and $20,000 on the State Tuberculosis Hospital, Galen. At the asylum a new modern kitchen is to be built and also a dormitory to hold sixty women. At the sanatorium a new dormitory is to be built.

Personal.—Dr. Frederick W. McCrimmon, Butte, sustained a fracture of the skull in a collision between his automobile and a motorcycle, July 18, and is reported to be in a critical condition in the Murray Hospital, Butte.——Dr. Arter W. Deal, Lewistown, health officer of Fergus County, and Mrs. Deal are making an automobile tour of the state.——Dr. Thomas C. Witherspoon, Butte, has been elected president of the Butte Chautauqua Association.

State Health Officers Hold Meeting.—At the annual meeting of the Montana State Health Officers Association held in Bozeman, July 12 and 13, the following officers were elected: president, Dr. Arthur Morrow, Kalispell; vice president, Dr. Drura R. Claiborn, Bigtimber; and secretary, Dr. William F. Cogswell, Helena (reelected). The next meeting will be held in Miles City. One of the principal topics of discussion was the "Rocky Mountain Spotted Fever," which was ably considered in a paper read by Surg. Lunsford D. Fricks, U. S. P. H. S., who has been making a study of this disease in Montana.

New State Officers.—The thirty-seventh annual meeting of the Montana State Medical Association was held in Bozeman, July 14 and 15, under the presidency of Dr. James H. Irwin, Great Falls. Miles City was selected as the place of meeting for next year, and the following officers were elected: president, Dr. Rudolph Horsky, Helena; vice presidents, Drs. Herbert H. Judd, Bozeman; George E. Brown, Miles City, and Edward M. Gans, Judith Gap; secretary-treasurer, Dr. Elmer G. Balsam, Billings (reelected); delegate to the American Medical Association, Dr. James H. Irwin, Great Falls (reelected), and councilors, Drs. Harry C. Smith, Missoula; Mark D. Hoyt, Glasgow, and Wimon W. Andrus, Miles City.

NEW YORK

Correction.—Dr. Roger S. Morris, Clifton Springs, whose name was erroneously given in THE JOURNAL of July 17, as Robert S. Morris, has been offered and has accepted the full-time professorship of medicine in the medical department of the University of Cincinnati.

Clinic Opened.—A clinic was opened in Little Falls, July 9, by Miss Catherine B. Dunn, who is acting as city welfare nurse. The clinic is open from 4 to 5 o'clock on Thursdays and Fridays in the Jefferson Street School Building and the physicians of the city are alternating in taking charge of the clinic.

Four-County Medical Society Organized.—At a dinner given recently at Warsaw to officers of the Medical Society of the counties of Allegany, Livingston, Genesee and Wyoming, by Dr. William R. Thomson, the suggestion was made that a four-county society be established and a preliminary meeting for this purpose was held at Letchworth Park, July 15.

Stringent Rules for Health Officers.—After November 1 of next year, local health officers may be appointed only after complying with special qualifications under regulations adopted by the State Public Health Council. This ruling of the State Department of Health affects nearly 1,200 positions throughout the state and means that officials must qualify in special health work subjects not ordinarily taught in schools of medicine.

Free Dental Institute for Rochester.—George Eastman, the head of the Eastman Kodak Company, has announced his intention of giving a site and $300,000 for a building for a free dental institution in Rochester. The gift will be

presented to the Rochester Dental Society. In addition, provided the city of Rochester will appropriate $10,000 a year for its maintenance, he will endow the institution with $750,000. It is proposed in this way to provide free dental service to all persons not able to pay for such work. In connection with the institution there will be an up-to-date laboratory for research work.

New York City

Attack the Fly Out Doors.—Since it is evident that no amount of swatting will exterminate the fly, the *Bulletin* of the health department calls attention to the necessity of vigilance to prevent the breeding of this nuisance and recommends as a valuable adjuct in the fly campaign the large outdoor flytrap. In fact the department is endeavoring to kill two birds with one stone by promoting the sale of these large flytraps which were made in the city emergency workshop under the supervision of the mayor's committee on unemployment, so that purchasing a flytrap from the city one may not only help to eradicate the fly but also to provide work for the unemployed.

Bureau of Foods and Drugs Issues Injunctions.—Dr. Lucius P. Brown, the new director of the Bureau of Foods and Drugs of the Health Department, has issued his first announcement which consists of a set of "Dont's" and "Do's" with reference to the care of food in the home, the danger of the house fly and advice on hot weather hygiene. It is announced that the inspectors of this bureau will devote their attention to an investigation of restaurants and public eating places with reference to sanitary conditions and the quality of the food dispensed and that there will be a similarly rigid inspection of the places where ice cream and soft drinks are sold. The venders who sell soft drinks for 1 or 2 cents a glass will be compelled either to cleanse their glasses with hot water or to use paper cups.

Personal.—Dr. Mark J. Schoenberg has been appointed instructor in ophthalmology in the College of Physicians and Surgeons of the City of New York.—Dr. John R. Murtin, assistant professor of physiology in Cornell University, has declined the position of biochemist to the Pellagra Hospital of the United States Public Health Service at Spartanburg, S. C., and also the professorship of physiology and physiologic chemistry in Fordham Medical School.——Dr. Joseph Wranna of the staff of St. Mary's Hospital, Jamaica, was painfully bruised, July 18, in a collision between the motor ambulance of the hospital and a trolley car in Woodhaven. ——An ambulance of the Kings County Hospital collided with the touring car of Dr. Louis M. Dusseldorf, Brooklyn, July 7, but the occupants of both cars escaped with slight injuries.

Vaccine in Whooping Cough.—The research laboratory of the department of health has been making extensive investigations in the vaccine treatment and prophylaxis of whooping cough and has reached the following conclusions:

1. Pertussis stock vaccines as prepared by the Bureau of Laboratories seem to have a prophylactic value when given in high doses.
2. In the treatment of pertussis, these vaccines seem to have shortened the duration and severity of the paroxysmal stage; the average duration of the whoop being twenty-five days, compared to forty days of those treated with drugs.
3. Further experiments with the view of obtaining more effective vaccines and a closer cooperation of the profession in public health education, may help in the eradication of pertussis, this scourge of childhood which kills yearly ten thousand American children.

In view of these results the laboratory now seeks the collaboration of private practitioners in a more extensive test of these vaccines. The necessary quantity of vaccine accompanied by a history card and directions for administration will be given to any city practitioner who will promise to report results obtained. In doubtful cases the sputum may be sent to the laboratory for examination. The sputum to be of value must be obtained early in the disease from the bronchus.

NORTH CAROLINA

Whole-Time Municipal Nurse.—Through the Antituberculosis Society of Newbern, the services of a whole-time municipal nurse have been secured to assist in the care of tuberculosis patients in the city.

Surgeons of Greensboro Organize.—The Greensboro Surgical Society was organized, July 6, with an initial membership of fifteen. Dr. John W. Long was elected president and Dr. Parran Jarboe, secretary.

Fire in Sanatorium.—On July 19 a fire occurred in a tuberculosis sanatorium at Asheville which did considerable damage to the third story of the building. Prompt action on the part of the attendants and the fire department enabled the twenty inmates to be removed without casualty.

New Health Bulletin.—*Our Communal Health* is the title of the newly issued health bulletin of the City of Wilmington and Hanover County boards of health. In the first issue it is stated that in 1915, of the population of 38,000, there will be spent in the city and county $23,575 for general health work, exclusive of garbage removal, and $23,000 for the Walker Hospital and Red Cross tuberculosis work.

Personal.—Maj. Eugene B. Glenn, Asheville, has returned after an encampment at Morehead City, at which he served as commanding officer of the sanitary corps.——Dr. Harvey P. Barret, Charlotte, has been reelected city bacteriologist. ——Dr. William F. Hargrove, Kinston, has returned from a visit to the Pacific slope.——Dr. Moir S. Martin, Stuart, Va., has purchased the Irvin Memorial Hospital, Mt. Airy, for $10,000.

Witch and Herb Doctor Discharged.—Lonnie Williams, a Negro-Indian itinerant physician, who has been operating for some time past in Rockingham County and in the adjacent Virginia counties, was recently arraigned in the local court of Sprague charged with illegal practice of medicine, but the inability of the prosecutors to show that the defendant had been paid a fee by any of his former patients, who were subpoenaed as witnesses against him, resulted in his discharge.

Hospital News.—Dr. Robert L. Holloway, West Durham, has decided to establish a baby sanatorium with accommodations for twenty-five patients at Rivermont Farm, near Durham.——The Presbyterian Hospital, Charlotte, has installed its new Roentgen-ray apparatus which has been secured at a cost of $2,000. Dr. James W. Squires will be in charge of this department of the hospital.——The Women's Hospital, Charlotte, was formally opened June 30. The institution will have accommodations for more than twenty patients and will be in charge of Drs. Charles H. C. Mills and William H. Crowell.——The Baby Hospital, Wilmington, was opened July 1.——For the time being, the Bear Annex of the James Walker Memorial Hospital, Wilmington, is being utilized, and this affords accommodation for ten patients, but if the institution proves to be a success, a permanent hospital will be erected at a cost of $20,000.

PENNSYLVANIA

Investigation of Occupational Diseases.—Headquarters are to be established in Pittsburgh for the investigation of occupational diseases. Laboratories will be fitted up at the United States Marine Hospital and the work will be under the supervision of Surgeon Joseph W. Schereschewsky, U. S. P. H. S.

Typhoid in Pottsville.—The physicians of Pottsville are fearful that the outbreak of typhoid fever will extend to a wide radius of towns in Schuykill, and Dr. Jerome B. Rodgers, president of the Pottsville Board of Health, has invoked the aid of the State Department of Health at Port Carbon where the epidemic started. There has been reported, up to July 21, a total of twenty-eight cases at Port Carbon with a dozen more at Saint Claire. A zone of fully 5,000 persons is menaced by the epidemic. A saloon property at Port Carbon was found to be infected with typhoid germs and has been closed by state authorities. The state health experts will examine all the local water sheds and particularly the milk supply.

Baby Week at Pittsburgh.—The week from June 27 to July 3 was set aside as baby week in Pittsburgh. During the week a free exhibition was held in the Wabash station where information about the campaign was obtainable and stereopticon talks were given on the care of babies. The purpose of the week was fundamentally educational. It sought to convince the people that it is sound, civic economy to reduce the sickness and death rate among babies; to impress on the community that it is responsisble for its babies; to inform the people of facts concerning the status of infant mortality in the city and what is being done to improve conditions which affect injuriously, the health of their babies; to give directly to fathers and mothers and sisters and brothers of babies, such information as will result in better care and feeding during the summer months; and to effect a better understanding in an endeavor to coordinate the various public and private agencies which have baby welfare as their primary object.

Philadelphia

Personal.—Dr. John F. McCloskey sailed for Europe to take up Red Cross work through the American Ambulance

Hospital in France.——Dr. James C. Attix was operated on July 15 in the Samaritan Hospital and is reported to be in a critical condition.

Baby Clinic.—The baby clinic of the Emergency Aid, at 1121 South Thirteenth street in the Italian quarter cares for an average of 100 babies at each clinic. These clinics are held Tuesday and Thursday morning from 11:30 to 1:30 and are under the guidance of Dr. Harriet MacSorley. Pasteurized milk is served by the nurses.

Open Sanitation Show.—The sanitation and health carnival, held by the Home and School League of the William Cramp School was opened July 19, and Director of Health and Charities, Dr. S. Lewis Ziegler was the chief speaker. The exhibit continued until July 24, and was intended to instruct residents of the neighborhood in the essentials of living in a sanitary manner. The league was assisted by the Philadelphia Sanitary Division, Department of Health and Charities, Child Hygiene, Babies Welfare Association, and different other welfare organizations.

Pennsylvania Unit in Paris.—Dr. J. William White, in charge of the University of Pennsylvania unit which went on duty July 1, at the American Ambulance in Paris, reports that all of the university party are well, and that when they assumed charge there were 181 wounded in the hospital. Public subscriptions are being taken in Philadelphia for the raising of the $10,000 required to finance the University of Pennsylvania contingent of physicians, scientists and nurses, who have taken charge of the American Hospital, Paris. Of this amount, $7,600 has already been subscribed.

Civil Service Examination.—The civil service commission of the city of Philadelphia announces that an examination for resident physician with a salary of $600 to $900 a year in the Bureau of Health of the Department of Public Health and Charities, and open to residents of Pennsylvania, will be held on August 13 at 9:30 a. m. Applicants must be graduates of recognized schools of medicine, licensed to practice in the state of Pennsylvania, must have had some institutional experience, and should be above 25 years of age. The duties of these four positions are to give medical assistance to the inmates of the institution to which they are assigned and any other appropriate duties. Applications should be made to the Civil Service Commission, City Hall, Philadelphia.

Housing Division Authorized.—On July 20, Mayor Blankenburg signed an ordinance passed by the councils at the last session for the summer, creating the new division of housing and sanitation in the department of health and charities. This puts an end to a controversy of more than two years standing between city officials and political leaders on the one hand and members of the housing commission on the other. Under the law the director of health is authorized to appoint a chief of the new division at $3,100 a year; a statistician at $1,200; three additional assistant clerks at $900 each; one additional stenographer and typewriter at $900; five additional inspectors at $1,000 each; two messengers at $480 each, and one additional cleaner at $360. These appointments were to go into effect on July 1, but the mayor's delay will make the appointments effective August 1. In connection with the establishment of this division of the bureau of health, Dr. Ziegler, the director, plans to subdivide the city into five areas for the standardization of birth and death statistics, and has tentatively created the following districts: Germantown; Frankford; North Philadelphia, between the two rivers and Wingohocking and Chestnut streets; South Philadelphia, between the rivers and Chestnut, and League Island and West Philadelphia.

VIRGINIA

Dr. Drewry's Assailant Fined.—At the trial of Frederick E. Perkins, charged with having feloniously assaulted Dr. William F. Drewry, superintendent of the Central State Hospital, on June 7, the defendant was found guilty of assault and battery, and fined $10 and costs.

Osteopaths and Surgery.—The State Board of Medical Examiners of Virginia has ruled that a knowledge of materia medica is essential to the practice of surgery and since schools of osteopathy do not teach materia medica, osteopaths are not qualified to practice surgery.

Trachoma Hospital at Coeburn.—A free hospital for the treatment of trachoma was opened July 1 at Coeburn. The expenses of the hospital are shared by the Public Health Service, the state of Virginia and the town of Coeburn. In addition to the treatment of trachoma, a campaign of prevention is also being carried out.

State Board Members Reappointed.—Drs. Lawrence T. Royster, Norfolk; Alexander G. Crockett, Max Meadows, and Reid White, Lexington, have been reappointed members of the State Board of Health.——The State Board of Health has confirmed the appointment of Dr. Roy K. Flannigan, Richmond, as assistant health commissioner, to succed Dr. Allen W. Freeman, resigned.

Personal.—Dr. H. Page Mauck, Richmond, has been appointed assistant in clinical orthopedic surgery at Johns Hopkins University, Baltimore.——J. B. Weems of Notaway County has been appointed chief chemist of the State Department of Agriculture, succeeding Dr. Magruder, resigned.——Dr. Charles E. C. Peyton, Pulaski, has been appointed assistant surgeon at the National Soldiers' Home, Dayton, Ohio.

CANADA

Dental Corps.—The Canadian dental corps is in process of organization for overseas service. It will be in command of Lieut.-Col. J. A. Armstrong, Ottawa, and with him will be associated Major Thomas Gibson, Ottawa, and Major A. A. Smith, Cornwall, Ont. There will also be twenty-four captains and twenty-four lieutenants. Several dental surgeons, already at the front, will be attached to the unit when it arrives in England.

Reciprocity Between Saskatchewan and Great Britain.—It is proposed to amend the medical profession act of Saskatchewan to establish reciprocal relations between that province and Great Britain. The amendment will provide that any practitioner duly registered by the general medical council of Great Britain may practice in Saskatchewan on payment of the necessary fees, satisfactory evidence of registration in Great Britain, and good character.

Personal.—Dr. Samuel J. N. Magwood, Toronto, has left for the theater of the war and will join the royal army medical corps as captain. At St. Michael's Hospital, Dr. Magwood was given a cheering send-off when the staff through Dr. Edmund E. King, Toronto, presented him with a wrist watch suitably engraved. Dr. J. Bryce McMurrick, Toronto, accompanied him.——The following Canadian medical men have been gazetted temporary lieutenants in the royal army medical corps: Drs. Howard H. G. Coulthard, Cedar Cottage, B. C.; Leonard A. C. Panton, North Battleford, Sask.; N. E. MacDougall, Vancouver, B. C.; Maurice J. Vigneux, Nelson, B. C.; James F. Adamson, Mannville, Alta.; Walter W. Kennedy, Vancouver, B. C.; R. Ingram, Vancouver, B. C.; Orie E. Finch, Vancouver, B. C.; William H. Lambert, West Westminster, B. C.——Dr. Hilbert W. Hill, London, Ont., executive secretary of the Minnesota Public Health Association, has been reappointed director of the Institute of Hygiene, London, Ont.——Dr. James D. Wilson, London, Ont., has been appointed physician to the jail, succeeding the late Dr. James MacArthur.——Dr. Earl S. Bolton, Medicine Hat, Alta., has been appointed medical officer of health of Brandon, Man.——Dr. J. E. McAskile, High Gate, Ont., house surgeon in Vancouver General Hospital, has left for France.——Dr. James H. Hamilton, Revelstoke, B. C., is medical officer of the fifty-fourth battalion in camp at Vernon, B. C.——Drs. F. W. Manning and Charles R. Totton, Windsor, Ont., have been appointed to staffs of hospitals in France.——Dr. Alexander B. Osborne, Hamilton, Ont., has been appointed chief of the eye and ear department of the Duchess of Connaught Red Cross Hospital at Cliveden, England.

Hospital News.—Queen's No. 5 stationary hospital which left for England a few weeks ago, is to be increased from 200 to 400 beds. It is in command of Lieut.-Col. Frederick Etherington, Kingston, Ont.——A clearing hospital has been established at Valcartier, Quebec, to receive wounded soldiers on their arrival from England.——Lieut.-Col. Wallace A. Scott, Toronto, is in command of the hospital at Shornecliffe, England. Col. George S. Rennie of Hamilton and Lieut.-Col. Henry R. Casgrain of Windsor are there also in command of No. 2 and No. 3 clearing and stationary hospitals.——Dr. Robert J. Manion of Fort William, who has been on the surgical staff of an Anglo-French Hospital, is at present in Canada, but will return to France shortly.——The following officers have joined the staff of the Canadian hosital at Le Touquet, France: Captain Jeffrey, Toronto; Capt. Edwin D. McLean, Truro, N. S.; Capt. Thomas F. O'Hagan, Calgary; Capt. Robert H. Smith, Moose Jaw, Sask.; Capt. R. F. Flegg, Ottawa; Captain Dean, Winnipeg; Capt. Kenneth D. Panton, Vancouver; Capt. Robert J. McEwen, Saskatoon.——The Vancouver Military Hospital,

accepted for overseas service, will be in command of Major Edward C. Hart, Victoria, chief of medical services in the province of British Columbia. The personnel will consist of thirty-two medical officers, one dental surgeon, two quartermasters, two warrant officers, twenty-one sergeants and staff sergeants, two buglers, 201 rank and file, and seventy-three nursing sisters. Major Frank C. McTavish, A. M. C., Vancouver, B. C., who served in South Africa, will accompany the hospital; also Dr. Arthur P. Procter, Vancouver, chief surgeon of the Canadian Pacific Railway in British Columbia; Dr. Alexander S. Monro, director of the Vancouver General Hospital; Drs. F. P. Patterson, Dr. John W. McIntosh, Austin B. Schinbein, Charles S. McKee, John H. Hogle, A. Rocke Robertson and Giles B. Murphy, all of Vancouver.——A hospital of 200 beds has been established at Camp Sewell, Man.——A hospital of fifty beds has been opened at Three Rivers, Que., in connection with the Montenegrin reservists' camp.

GENERAL

Military Preparedness.—Dr. Joseph Leidy, the Philadelphia surgeon, has announced publicly through the daily press that he will be one of the 100 men to subscribe $1,000 each to introduce military training in the high schools of Philadelphia. Dr. Leidy was delegated in June by the French Red Cross to investigate the facilities of America for supplying a large government order for artificial limbs for French army officers and privates.

Chattahoochee Valley Physicians Hold Meeting.—The Chattahoochee Valley Medical and Surgical Association held its fifteenth annual meeting in Opelika, Ala., July 13 and 14, under the presidency of Dr. O. Velpeau Langley, Opelika. About seventy-five were in attendance at the banquet, which was tendered the association by members of the Lee County Medical Society. The next meeting of the association will be held in Alexander City.

Conference on Race Betterment.—The second National Conference on Race Betterment will be held in San Francisco, in connection with the Panama-Pacific International Exposition, August 4 to 8. The program begins with a morality masque, "Redemption," which will be conducted at the Oakland Civic Auditorium. The formal numbers of the program will consist of three sessions to be held at the Inside Inn, a morning and afternoon session on August 6, and a morning session on August 7. At these sessions the evidence of the need for race betterment, the work of the agencies working for race betterment, and eugenics and the importance of the constructive program for race betterment will be discussed.

FOREIGN

The Sultan's Illness.—The *Medizinische Klinik* reports that Prof. J. Israel, the noted genito-urinary surgeon of Berlin, has been called to Constantinople for consultation at the bedside of the sultan.

Hero Medal to Italian Physician.—Dr. De Sanctis has received a Carnegie medal, with its accompanying $100, in recognition of the services rendered by him during the earthquake of January 13 in eastern central Italy.

Lieben Prize to Trendelenberg.—At its recent annual meeting, the Academy of Sciences at Vienna elected Prof. V. v. Lang as president. The I. Lieben prize was awarded to Prof. W. Trendelenberg of Innsbruck for his research on the motor disturbances in monkeys following loss of parts of the brain.

New Hospital Building.—Among the various public works to be undertaken at Dunedin, New Zealand, are two new buildings in connection with the Dunedin Hospital. The first is a new medical schoolbuilding to cost $65,000, and the second a hospital for infectious diseases which will be erected at a cost of $25,000.

Distress in Mexico.—Telegrams received at Red Cross headquarters, July 24, from Eagle Pass, Texas, picture the desperate distress of the people of Monclova, Mexico, where they are subsisting on cactus. In Saltillo the people are actually dying from starvation.——A carload of corn and a carload of beans has been sent by the Red Cross special agent into the Monclova district.

Relief Schooner Sails.—The three-masted auxiliary schooner, *George B. Cluett*, sailed from Boston on July 21 for the Arctic, in quest of the exploration party of Donald B. McMillan, and en route will call at the Grenfell Mission, St. Anthony, Laborador, taking supplies and five missionaries, including Dr. Elmer Wallace, Brockton, a dentist. The ship will then proceed to Etah, Greenland.

Hospital Resources of Portugal.—The authorities of Portugal have sent a question blank to every hospital and clinic in the country to collect data as to the number of beds, personnel, supplies of hospital equipment, etc. The *Medicina Contemporanea* remarks that this has been done "in the prevision of a probable intervention of Portugal in the European conflict, and also in preparation for a possible epidemic."

WAR NOTES

Medical Supply Exports Doubled.—The Bureau of Foreign and Domestic Commerce estimated on July 16 that during the year ended June 30, 1915, the exports of medicines and surgical instruments amounted to $35,744,000, as compared with $19,916,000 for the preceding year.

Typhus Checked.—The American vice consul at Belgrade cabled, July 22, that the typhus epidemic in Serbia and Montenegro is under control, and that an appropriation of $10,000 for use in Serbia will be ample for the control of the disease during the next two months.

Alleged Examiner of British Recruits Arrested.—Dr. Thomas Addis of Lane Hospital, San Francisco, alleged examining physician for British recruits, was arrested July 9, and released on bond on two indictments charging the hiring and retaining of recruits for the British service and conspiring to do so. Messrs. Blair and Murdock, the firm at whose office recruiting headquarters for the British army were alleged to have been maintained, were also indicted.

War Helps Medical Women.—A statement signed by the premier, Lord Curzon, and Hon. Arthur J. Balfour calls the attention of the public to the work in London of the School of Medicine for Women, which has now doubled its plant in an endeavor to cope with the war-time increase of opportunities for women physicians. The statement begins as follows: "The war constitutes the turning point in the position of medical women, for whom there are new openings and new opportunities in many directions."

Term "Sanitäter" Taboo.—The colloquial term "Sanitäter" is being familiarly applied in Germany to the members of the sanitary service of the army and the volunteer medical men and orderlies taking care of the sick and wounded. An official decree forbids the further use of the term. The lower grades in the sanitary service of the army must be designated Sanitätsoffizier, Sanitätsfeldwebel of Sanitätsmanschaften. The volunteer medical and other helpers must be designated volunteer nurse, volunteer orderly, etc. Even in personal intercourse the use of the expression "Sanitäter" is not allowed further.

Medicinal Plants in Germany.—The *Münchener medizinische Wochenschrift* states that the minister of the interior has appealed to the apothecaries to stimulate the collecting and drying of medicinal plants and parts of plants in their districts. They can then prepare them for medicinal use, each in his own laboratory or by exchanging them with others. He explains that large amounts of the plant drugs used in making medicines have always hitherto been imported from other countries for this purpose. The war has rendered it very difficult to import them now or has shut off the supply completely. A list of plants useful for the purpose is given, including the flowers of arnica, chamomile, linden, elder and mallow, and the leaves of digitalis, walnut, belladonna, colt's-foot, henbane, stramony and the buckbean and various herbs and berries. Children can be taught to collect them, and also the elderly and the otherwise incapacitated, so that there need be no difficulty in collecting an adequate supply.

Aid for Belgian Physicians.—The report of the treasurer of the committee of American physicians for the aid of the Belgian profession for the week ended July 24, 1915, lists the following contributions:

Dr. Charles H. Dowd, New York	$ 25.00
Dr. Emil Lofgren, Rockford	5.00
Columbia Medical Society, Columbia, S. C.	20.00
Receipts for the week ending July 24	$ 50.00
Previously reported receipts	7,700.84
Total receipts	$7,750.84
Previously reported receipts:—	
1,625 standard boxes of food @ $2.20	$3,575.00
1,274 standard boxes of food @ $2.30	2,930.20
353 standard boxes of food @ $2.28	804.84
Total disbursements	$7,310.04
Balance	$ 440.80

F. F. SIMPSON, M. D., Treasurer,
5 Jenkins Arcade Bldg., Pittsburgh.

BERLIN LETTER

BERLIN, June 22, 1915.

Personal

Professor Tobler, chief of the children's hospital connected with the University of Breslau, succumbed June 2, aged 38, to sepsis, the effect of a furuncle on the back of the neck. He was born in Switzerland; studied under Vierordt and A. Czerny, and obtained his medical degree at Heidelberg where, in 1911, he was appointed professor extraordinary. Soon afterward he accepted a call to Breslau to succeed Professor Pirquet, who had gone to Vienna. Tobler published a number of works on the physiology of the child, and on the pathology of nutrition and metabolism. The article on the urogenital apparatus in Feer's "Manual of Pediatrics" was from his pen.

Professor Matterstock, the former director of the policlinic for internal and children's diseases at Wurzburg, died early in June, aged 67. He had published several notable works, especially in the field of the pathology of the heart.

Another victim to typhus is Professor Lüthje, chief of the medical clinic at Kiel. He contracted the disease on a visit of inspection to a camp of Russian prisoners, and it proved fatal in a few days. Lüthje was only 44 years old, but had published a number of exhaustive works on metabolic diseases, especially diabetes. He studied under Krehl and G. Klemperer, and early took up independent research.

The Food Supply

The restrictions that were imposed on the consumption of bread are fortunately being reduced more and more. When it was learned officially that there is a large reserve of grains to carry us to the harvest (*7 millionen Doppelzentnern Getreide*), the bread ration per capita was increased. The authorities regarded it as especially important that the bread supply for working people should be made more ample. However, every one soon became accustomed to the restrictions on bread, and no one complains any more. This is the more readily understood as the consumption of meat and of bread used to be above what was actually required—a *Luxuskonsumtion*. With regard to other foods, conditions have righted themselves so that the menus show scarcely any difference from those of peace times. The only thing in this line that reminds us of the war is the increased cost of meat and other articles of food except certain vegetables. It is remarkable, moreover, that other countries, even the neutral ones, are having a similar experience, suffering from higher prices to almost the same degree as we are.

Some official figures have been published recently comparing the prices now and a year ago. The price of 1 kilogram in May, 1914, and May, 1915, was for

1 kg. wheat flour,	May, 1914, 0.37 mark;	May, 1915, 0.55 mark
1 kg. rye flour,	May, 1914, 0.29 mark;	May, 1915, 0.55 mark
1 kg. potatoes,	May, 1914, 0.07 mark;	May, 1915, 0.15 mark
1 kg. butter,	May, 1914, 2.61 marks;	May, 1915, 3.54 marks
1 kg. milk,	May, 1914, 0.20 mark;	May, 1915, 0.24 mark
1 egg	May, 1914, 0.07 mark;	May, 1915, 0.11 mark
1 kg. sugar,	May, 1914, 0.50 mark;	May, 1915, 0.58 mark
1 kg. coffee,	May, 1914, 3.08 marks;	May, 1915, 3.35 marks
1 kg. rice,	May, 1914, 0.48 mark;	May, 1915, 1.22 marks

It should be added that the prices in May were in part lower than in the preceding months. In London, according to the London correspondent of the Swiss Zurich *Post*, flour is 71 per cent. higher than last year; butter, 24 per cent.; meat, 30 per cent.; tea, 25 per cent.; sugar, 88 per cent.; fish, 50 or 75 per cent., and refrigerated meat costs 100 per cent. more than it did last year.

Naturally the increased cost of living would bear particularly hard on the poorer classes, especially those families whose breadwinner is serving in the army, if it were not for the assistance rendered by the state, the local organizations and private philanthropy. Without exaggeration I can affirm that of my own knowledge I am not aware of any distress from the high cost of living at present more than in times of peace, and the lay press has not published anything suggesting this in any part of the empire. My assertion will receive more credence when the amount of the sums that have been contributed for assistance is realized. Although I have mentioned this before, yet I may be permitted to repeat that the social insurance companies had spent for relief purposes, in connection with the war, up to June 1, 13,000,000 marks ($3,250,000) of their reserve funds. Besides this, 56,000,000 marks ($14,000,000) have been loaned to communities for relief purposes, and they took up 290,000,000 marks ($72,500,000) of the war loans.

Recovery of Wounded Soldiers

There is not much new to report in regard to the military medical and surgical service. According to a recent report of the war department, of the wounded who have been given treatment in the hospitals in the home zone, 88.5 per cent. have been discharged as able to resume their service with the troops, and only 0.5 per cent. died.

Spectacle Wearers Among the Troops

Germany has been ridiculed as a nation of spectacle wearers, but only 3.5 per cent. of a division of 11,000 men were found to be dependent on glasses. This subject was investigated by Weigelin, an ophthalmologist of Stuttgart, who was ordered to find how many of the men in a division of 11,000 troops were dependent on glasses and how many had a reserve pair on hand. Only a few of the 386 spectacle wearers had a reserve pair; 381 were actually dependent on their glasses. Estimating the number in a whole army corps at this ratio would give 1,750 spectacle wearers. Among the 386 examined, 214 were myopic; 74 hyperopic; 12 with age impairment of vision; 81 with astigmatism, and 5 with defects it was impossible to correct.

PARIS LETTER

PARIS, July 8, 1915.

The War

ULTERIOR RESULTS OF TREPHINING IN PENETRATING WOUNDS OF THE SKULL

At the medical reunion of the fourth army Dr. H. Fresson of Shanghai reported twenty-two cases, which were followed for four and a half months, of trephining for penetrating wounds of the skull. The results comprise twenty deaths and two patients discharged cured or at least with wounds cicatrized after three months. One patient is still affected with partial hemiplegia and the other has serious mental troubles. The examination of these cases leads to some interesting conclusions: 1. Improvement generally follows operation and often leads to a belief in definite cure, the patient resuming normal life; then there suddenly occur sphincter troubles and mental disturbances, gradually leading to death in the midst of more or less distinct phenomena of meningo-encephalitis. 2. All the patients whose wounds were completely sutured in the ambulance had to have drainage put in later (five cases). In spite of these rather disappointing ulterior results Fresson will continue to trephine but with the greatest rapidity and the least disturbance of the tissues possible. He will make use of roentgenoscopy whenever circumstances permit and will never suture the wounds completely.

Dr. Paul Launay, surgeon of the hospitals of Paris, emphasizes the considerable immediate improvement obtained by trephining in both serious and light cases, and unfortunately short duration of these successes. In a few days or in a week or two, slow or rapid complications of encephalitis arise and carry off the patients, who had at first seemed to justify a hopeful prognosis. Launay likewise emphasizes the absolute necessity, in military surgery, of refraining from suturing wounds of the skull or of any other part.

Dr. Brechot of Paris also recognizes that the ulterior results of penetrating wounds of the skull with lesions of the brain are very disappointing. Unexpected complications cause sudden death in patients who seem on the road to recovery. Recently a patient on Dr. Brechot's service who had been under treatment for two and one half months died in a few days in coma with a marked elevation of temperature although it was not possible to establish the presence of any infection. The patient had seemed to be recovering. Another who had been under treatment for three months and who had been trephined seemed likely to recover after a secondary abscess of the brain. Recently his general condition changed and an incomplete crisis of jacksonian epilepsy appeared.

Dr. Lapointe, surgeon of the hospitals of Paris, remarked that the immediate or remote seriousness of wounds of the head evidently depends on the existence or absence of a brain lesion. With the dura mater intact, the immediate mortality in forty-seven of his patients operated on was only 7 per cent., while wounds involving the brain, whether the projectile was or was not retained, gave a mortality of 56 per cent. in seventy-four patients operated on. These operations were performed at the front. Lapointe was not able to follow his patients for more than a few weeks, but it is to be feared that their after-history was the same as that of Fresson's patients.

Dr. Potherat, surgeon of the hospitals of Paris, agreed with the previous speakers. It is necessary to recognize, he said, that the ulterior results of trephining for penetrating wounds of the skull with much laceration of the cerebral substance and especially with foreign bodies included do not confirm the high hopes that were originally felt for early operation. At the battle front, even in the most serious cases, operation, with removal of bone splinters and aseptic and antiseptic cleansing of the wound, may and often does give results which exceed all hopes. Prostration, stupor, coma, and partial paralyses may even disappear; fever and vomiting cease or diminish; the mind clears up and there is every indication of return to a normal condition. The patient is discharged and unless one has some warning of the possibilities still in store, the case is recorded as cured. In a little while, however—a few weeks, a month, two months, rarely longer—complications of diffuse or localized encephalitis occur, at first insidious, later pronounced, and the patient succumbs. Unless one awaits ulterior results, therefore, one runs the risk of innocently falsifying statistics; that is, of recording as cured patients who have not stood the test of sufficient time after operation for their final condition to become apparent.

Dr. Weitzel also, from his personal experience during the Russo-Japanese and Balkan wars, confirmed Fresson's conclusions.

TREATMENT OF ATONIC WOUNDS BY GYMNASTICS AND VENTILATION

In base hospitals patients are frequently seen who present old superficial wounds, sometimes of very slight extent, which show no tendency toward cicatrization. In such cases, Dr. François Debat, assistant in dermatology at the St. Antoine Hospital, at present in charge of a special service in the military hospital of Bourges, obtains excellent results from a method which consists (1) in irritating the tissues by "intermittent dressings" as little as possible and (2) by exciting their vitality as much as possible by gymnastics and ventilation. No antiseptics whatever are used. At the outset a light, soft dressing of fine gauze slightly dampened with 0.9 per cent. saline solution is applied. This is covered with a light layer of carded cotton. To avoid all maceration the wound is exposed each day to the open air for a constantly increasing period of time, the first day for two hours, and as the exudation diminishes the period of exposure is increased an hour a day. As soon as there is no more exudation it is advantageous to replace the saline solution by an application of a thick paste of zinc oxid to which 3 per cent. ichthyol has been added.

Moreover, following Jacquet's technic, Debat mobilizes the muscles subjacent to the wound for five minutes every hour, the limb being elevated meanwhile. He has the patient remain in bed if the lesion is in the legs and carry the arm, if that is the injured member, in a high sling. Daily massage is practiced consisting of effleurage of the limb and light pinching of the peripheral teguments. Once or twice a day the wound is ventilated with a little electric apparatus which projects air either at room temperature or hot. Cold air is reserved for hyperemic lesions; hot air for lesions in which the circulation is retarded. Treatments last for five or ten minutes.

This method, which heals sluggish wounds with remarkable rapidity, is contraindicated in cases of fistulous wounds, in pronounced lymphangitis and in suppurating lesions of the sheaths of the tendons and articulations.

THE TREATMENT OF SICK OR WOUNDED SOLDIERS AT MINERAL SPRINGS

I mentioned in a previous letter (THE JOURNAL, May 22, 1915, p. 1777) suggestions made for the use of our thermal stations for wounded soldiers. It is said that many soldiers are affected with sequelae of wounds or operations which would be benefited by treatment with mineral waters. The minister of war has therefore decided to use many of our mineral water stations for this purpose and has sent a circular letter to the regional directors of the medical service enumerating about thirty mineral water stations to which wounded or sick soldiers may be sent with the class of cases for which each spring is suitable.

Efficacy of Antimeningococcus Serum in the Present Epidemic of Cerebrospinal Meningitis

During this year, there has been an outbreak of cerebrospinal meningitis, undoubtedly of a much more serious type than in previous years. Notwithstanding, serotherapy has given very remarkable results, as is shown by a paper recently read before the Académie de médecine by Dr. A. Netter, agrégé professor at the Faculté de médecine de Paris. Among patients treated with antimeningococcus serum, the mortality has not exceeded the remarkably low figure of 3 per cent. Serotherapy, moreover, has been a boon in that it has attenuated symptoms, made recovery much more rapid and complications and sequelae rare. These results are obtained on condition that the serum is injected as early as possible after onset (which presupposes an early diagnosis), that massive doses of the serum are used, that the injections are systematically renewed for three consecutive days, at least, and still longer if the bacteriologic examination still shows microbes to be present and that a polyvalent serum is used as much as possible.

The less satisfactory results recorded are due to neglect of these rules and to delay in diagnosis, which is often very difficult. They are explained in part also by the confusion between meningitis due to meningococci and that due to other organisms.

Death of Dr. Fernand Guéguen

Dr. Fernand Guéguen, agrégé professor at the Ecole supérieure de pharmacie de Paris, has just died. He was a very able young botanist. Among other botanic and bacteriologic works which had earned him a high reputation in the scientific world, Guéguen had published a remarkable study on poisonous mushrooms and interesting investigations on a serum intended to combat the toxic effects of the amanita and other poisonous mushrooms.

Death of Professor Eugène Koeberlé

Professor Koeberlé has died in Strasburg, aged 87. Koeberlé owes his celebrity mainly to having successfully performed an ovariotomy, June 2, 1862 (THE JOURNAL, Sept. 7, 1912, pp. 809 and 814). At that time ovariotomy had a certain vogue in Great Britain, but in France it was regarded as a dangerous procedure. According to Moreau, the women who survived it might be compared to those lucky fellows who, thanks to some chance circumstance, like a bad cord, survived hanging. Although this operation, which was performed for the first time in the United States by Ephraim F. McDowell in 1809 had been performed in France by Woyeikowski in 1844 at Quingey, department of the Doubs, and by Vaullegeard in 1847 at Condé-sur-Noireau, its real introduction into France is due to Koeberlé. To him also is due the fixation of the operative technic in hysterectomy and the morcellation of tumors. Of late years Koeberlé had lived in deep retirement, which he devoted to works of erudition and archeology.

LONDON LETTER

LONDON, July 9, 1915.

The War

THE HEALTH OF THE ARMY

Sir William Osler, speaking at the annual meeting of the Research Defense Society, said that the occurrence of only 1,000 cases of typhoid fever during the period of the war among the forces of this empire was something which only those who understood the history of typhoid in other wars could appreciate. It was a matter of much satisfaction that at least 60 per cent. of the wounded returned to the fight. We were not going to have the tragedy of the South African War, or the Napoleonic wars, or of the Civil War in America, with their parallel columns of figures showing the numbers of killed and wounded and the thousands of deaths from disease. We were going for the first time to have a war in which the bullet, and not disease, would be accountable for the larger number of deaths. The Research Defense Society worked in the hope that it might do something to educate the public so that it might receive the benefits which followed from protective sanitation. Fifty years ago, at the close of the Civil War in America, we had no positive knowledge of the cause of any one of the great scourges of humanity, but we now know the causes of the great majority of them. The practical bearing of this knowledge on the present war was that during the ten months of hostilities we had had no epidemics, a most remarkable result when we remembered that this country alone has millions of men under arms. Such a thing had never before occurred in the history of any war. Septic wounds had been unavoidable, owing to the methods of warfare and the environment in which the fighting took place, but even under these conditions from 60 to 70 per cent. of the wounded were able after treatment to take their place again in the fighting line. Tetanus, which at the beginning

of the war was rather serious, had now practically been abolished.

THE PAYMENT OF WAR CONSULTANTS

The government has amply provided the army with consultants and specialists of the first rank, many of cosmopolitan reputation. The sick or wounded soldier is thus insured the best skill if his case should be a difficult one. These consultants are given the rank of lieutenant-colonel and draw the corresponding pay, about $4,000 a year. For some reason the Admiralty, which is of course entirely independent of the War Office, which controls the army, appointed six consultants with a salary of $25,000 a year, who retained the right of private practice subject to the condition that it did not interfere with their official duties. An outcry at once took place in Parliament at the magnitude of the salary and the difference between it and that paid to the army consultants. The men appointed were all in the first rank, and included the president of the Royal College of Surgeons. In spite of a pronouncement from Sir William Osler that the country was receiving good value for the money, the government yielded to the protest and has made new arrangements for seven consultants who will be given temporary commissions as surgeon-generals with the corresponding pay, about $7,000 a year, and two temporary commissions as fleet surgeons of ten years' seniority, with the corresponding pay of about $3,500 a year. Their engagement will not entirely preclude private practice. The result is the opposite of what Sir William Osler asked—that the army consultants' pay should be brought up to the level of their brethren in the navy. He pointed out that many of them have fixed charges, domestic and educational, from three to four times in excess of the medical pay of a lieutenant-colonel in the army. Moreover, absence of a year or two would put them out of touch with their clientele. The government seems to have awakened to the fact that competence is not the same thing as public recognition or fashionableness, and that it is possible to get younger men quite as good as, perhaps better in some ways than, the older and fashionable men who make large incomes. There are many young surgeons of the first class who do not make large incomes, as they are known to only a small circle, and, no doubt, they will be glad to accept the appointments, quite apart from patriotic considerations.

BUDAPEST LETTER

BUDAPEST, June 10, 1915.

The War

OBSERVATION HOSPITALS IN HUNGARY

There are fourteen observation hospitals in northern Hungary, employed to check the spread of epidemic disease from sick soldiers coming from the northern battlefields. The fourteen hospitals are capable of accommodating from 80,000 to 100,000 patients. Each hospital consists of ten to twenty-five barracks. The largest one, at Miskolcz, consists of fifty-four barracks. Here the medical service is handled by thirty-four doctors, directed by the minister of public hygiene. There are about 250 male and female nurses employed. The number of sick and wounded soldiers varies between 4,500 and 5,000 daily. During April and May, the influx into these hospitals was somewhat less.

Of course, when the soldiers reach these hospitals, they are dirty, shabby and infested with lice; but no matter how dirty they may be arriving, within one hour, the wounded soldier is bathed and comes out of the bath clean shaven, shorn and free of lice and gets a snow white bed, where he is shortly examined by his doctor. Out of the fifty-four barracks in Miskolcz, eighteen are reserved for typhus and dysentery patients; the rest are kept for so-called "clean" patients. There are two surgical sections, for clean and for infected patients. The number of patients under the attendance of one doctor varies between 180 and 200. The surgeon makes rounds twice daily.

The "menu" of wounded but not sick patients, the so-called IV diet, is as follows: breakfast, milk or coffee; lunch, meat-soup, meat, vegetables or pudding; supper, goulash or vegetables with sausage or with bacon. In addition to this, every soldier gets 750 grams of bread. Every hospital is provided with electric light, water mains and a steam laundry, capable of washing and drying 1,000 pieces of linen daily.

NERVE SUTURES

Injuries of the limbs are frequently followed by paralyses, caused sometimes by the rupture of the nerve itself, or by the pressure of a hypertrophic callus, etc. Sometimes the wounds are quite unimportant, and heal in a week or two. Paralysis of the limb is the worst consequence of the injury. In such cases the nerve is sutured, the result being that in three or four weeks (with thighs two or three months) the nerve regains its activity. Dr. Paulikovics, regimental surgeon in a Budapest garrison hospital, devotes all his attention to such operations, and a considerable number of patients have been cured.

HOME FOR CONVALESCENTS IN MARIENBAD

The management of Marienbad, Bohemia, erected a doctors' home capable of accommodating fifty or sixty convalescent doctors, providing them with free board. To the free places only Austro-Hungarian and German physicians are eligible. Their families enjoy 50 per cent. reduction in the prices of hotel accommodations, while the treatment itself is quite free. The home is open from May to the end of September. The first to be admitted are those doctors who owe their disease to activities in the present war, and who by reason of gunshot wounds, rheumatic diseases or heat affections need mud or carbonic acid baths.

SOME FEATS OF OUR SANITARY ORGANIZATION

The *Orvosi Hetilap* (medical weekly) says that the military sanitary authorities in Poland found terrible hygienic conditions in the villages. The inhabitants pile the waste before the houses in rows, and it is never collected. In these places, typhus fever is never entirely absent. A surgeon-general of the Austro-Hungarian army discovered twenty cases and interned the patients in barracks contrary to their will. The houses were disinfected, and soldiers who had come in touch with such patients were quarantined. The epidemic shortly stopped and not a single soldier fell ill.

From the point of view of infectious diseases, the fight against dirt is of great importance. An aid to this end is the institution of baths in which soldiers bathe every eight or ten days and while they bathe their clothes are rendered germ free.

Apparatus for the boiling and cooling of drinking water are carried after the marching troops. All hospital trains, also, are provided with such apparatus, and in addition a bacteriologic car, consisting of three compartments: a laboratory, a writing room and a culture medium kitchen. The next car serves as a sleeping and dwelling car for the laboratory expert. Such a train in one or two hours can reach any place where there is an epidemic. For infectious patients separate cars are provided.

The surgeon-general mentioned above formed his convalescent patients into companies under the control of convalescent subalterns, supervised by medical men for the purpose of engaging in gymnastic games and moderate military exercises. He noticed that ordinarily the convalescent soldier loses his self-reliance after his recovery; but by partaking in exercises, he shortly becomes aware of his strength. He observed, for instance, that during a snow ball game, a third of the convalescents discovered that they were capable of work, and next day reported as fit for joining their respective troops in the battlefield.

THE CARE OF THE INVALIDS OF THE WAR

The Committee for Caring for the Crippled and Invalid Soldiers, with the support of the military authorities, is at work over the whole country, but its chief activity is in Budapest, where doctors, military persons and civilians are doing their utmost to render the fate of these miserable people the more endurable. The committee endeavors to cure these people and to render them capable of working. The committee will introduce three kinds of treatment: surgical after-treatment, mechanotherapy and thermal treatment. At present there are two hospitals preserved for the accommodation of crippled soldiers. Mechanotherapy is done in one of these hospitals where a Zander institute is provided, which is capable of treating 150 patients in an hour. Thermal therapy is given in the Kaiserbad in Budapest and in the artesian bath, both reaching 50 C. (122 F.). In the former there is a large swimming bath, where 240 soldiers can bathe in an hour. There are other thermal baths in Buda (a part of Budapest) which will also accept crippled soldiers. Besides bathing, the crippled and lame soldiers will be taught industrial and office work, and the best possible artificial limbs will be given to them. Efforts will also be made to find work and homes for the invalid soldiers. In this work a special committee of the Red Cross will help. Industrial teaching will be given in the industrial schools, where there

are huge workshops. Special attention will be paid to invalids who were farmers, in order that they may be able to continue their healthful occupation. June 30 a census of the invalid soldiers will be made in the whole country. The blind soldiers are supported by a special committee, the Blind Support Union, which has already collected more than 3,000,000 kronen ($600,000). One paper alone, the *Az Est*, has collected more than 600,000 kronen ($120,000) for the blind. The Budapest committee will shortly appoint subcommittees in provincial towns.

MILITARY EDUCATION OF MEDICAL AND PHARMACEUTIC STUDENTS

During the war the military training of medical students lasts six weeks with the infantry troops and ten weeks with the jaeger (hunter) troops. Afterward they commence service in the first line; according to necessity on the recommendation of the medical chief they can be employed in sanitary service. After the six weeks' education they become Gefreiter (the first rank). If they show special skill they may be promoted to the rank of corporal. The latter after another six weeks' service may be promoted to the rank of Zugesführer. Medical doctors who intend to become officers (combatant) have to withdraw voluntarily from the advantages allowed medical students. After half a year's service the medical student, if deserving, becomes an assistenzarzt Stellvertreter (auxiliary assistant doctor) and after another three months' service an assistant doctor with the rank of a lieutenant. The military education of pharmaceutic students similarly lasts six weeks. Afterward they become Gefreiter, and eventually corporals. A further six weeks' education follows, after which the corporals become Zugesführer. After six months' service, if the student shows good progress in theoretical and practical knowledge, he becomes a sergeant and afterward an accessist (the rank of a lieutenant).

Statistical Data About the Increase of Population of Europe

The Budapest statistical bureau publishes interesting data on the decrease of the birth rate in the civilized world during the last eighty years. According to this report, the number of births decreases in Europe from east to west. In 1913 the rate per thousand population was as follows: Russia, 43.9; Bulgaria, 42.0; Roumania, 39.2; Serbia, 38.5; Austria, 32.6; Hungary, 35.7; Italy, 33.3; Spain, 33.1; Portugal, 32.3; Germany, 29.8; Holland, 28.6; Denmark, 27.5; Norway, 26.1; Sweden, 24.7; Great Britain, 25.0; Switzerland, 25.0; Belgium, 23.6; France, 19.6. Hand in hand with the decrease in birth rate, however, the death rate similarly decreased from east to west. The death rate per thousand population in 1913 was: Italy, 28.9; Roumania, 24.8; Bulgaria, 23.5; Serbia, 22.1; Hungary, 23.1; Spain, 23.3; Austria, 23.0; Portugal, 19.8; France, 17.8; Germany, 16.2; Belgium, 15.2; Switzerland, 15.1; Great Britain, 14.0; Sweden, 14.9; Holland, 13.6; Denmark, 12.9. From the comparison of these two series of numbers, the following conclusion can be drawn. The increase of population in 1913 per thousand population has been: Bulgaria, 18.5; Serbia, 16.4; Holland, 15.0; Russia, 15.0; Denmark, 14.6; Roumania, 14.4; Germany, 15.6; Italy, 13.4; Portugal, 12.7; Norway, 12.6; Hungary, 12.1; Austria, 11.3; Great Britain, 11.0; Sweden, 10.7; Switzerland, 7.9; Spain, 9.8; Belgium, 8.6; France, 1.8.

Inoculation Against Cholera

The bacteriologic institution of the Budapest Royal Scientific University distributes free serum for the inoculation of those who are exposed to the danger of cholera infection: persons who disinfect, hospital laundry women, and those occupied with burying corpses of infectious patients. The instructions issued by the minister of public hygiene are as follows:

1. Inoculation against cholera is an active immunization; that is, it is done with the disease-causing bacteria themselves, so that under their action the immunizing material, the antidote, is prepared by the organism itself. Thus the inoculating substance is not a healing serum as, for instance, diphtheria serum, but a protective substance, as smallpox vaccine.

2. From the fresh culture of cholera bacillus, a bacterial emulsion is made with physiologic salt solution so that in 1 c.c. there are, as a rule, 2 mg. of bacteria. The serum is accompanied with directions explaining the mode of application. This fluid has been exposed to a temperature of 56 C. (132.8 F.) for one hour in order to kill the bacteria. Afterward for preservation, phenol is added so that the fluid shall contain 0.5 per cent. thereof.

3. Doctors are obliged to see that inoculation be made with such serum only, the sale of which is permitted by the ministry.

4. With this serum, patients are inoculated twice, at intervals of from five to ten days. At the first vaccination, 0.5 c.c., at the second 1 c.c. is to be administered from the well-shaken fluid. With persons suspected of being infected with cholera, it is better to wait the five days' latency, and the vaccination is to be performed only afterward.

5. The vaccination is performed with a carefully sterilized needle, the serum to be injected into the subcutaneous connective tissue on the arm or on the abdominal wall between the umbilicus and groins. The skin is to be painted with tincture of iodin before the injection is made.

6. If the serum has been prepared carefully, that is to say, it is free from foreign germs, and it was heated to 56 C., the reactive symptoms with rare exceptions are light, and are restricted mostly to tenderness around the site of the injection. Sometimes less or greater rise of temperature or slight diarrhea, fatigue or redness of the skin may be observed, which changes disappear in one or two days. Properly administered inoculations are quite free of any danger.

7. The immunity of the vaccinated persons sets in after several days; therefore it is advisable that those who expect to come in touch with cholera patients or will be exposed within an anticipated time to the danger of infection (doctors, nurses, disinfecting persons) shall be vaccinated at least eight days previously.

8. The duration of immunity varies within a few months and one year.

9. The degree of immunity is different. According to past experience, vaccination considerably decreases the number of deaths, and advantageously influences the course of the disease.

10. As the vaccination does not confer absolute safety, it is necessary that those vaccinated shall adhere strictly to hygienic rules applying to prevention, in which the lay public is warned by means of posters.

As a proof of the reliability of these prophylactic measures stands the low number of cases reported since they were begun. For instance, in the period from May 3 to May 9, in the whole territory of Hungary twenty-four fresh cases were reported with six fatalities. Those who were sick included one civilian—a refugee—eight captives of war, and nine military subjects. Those who died were: one civilian, one refugee and four soldiers.

Night Service in Drugstores

Before the outbreak of the war, every chemist's shop was compelled by law to employ night service. Until the beginning of this year this custom was preserved despite the relative want of assistants. Since the beginning of this year, however, the want of chemists' assistants was so noticeable in Budapest and in larger provincial towns that it has been impossible to continue the night service system. For instance, in the last month in Budapest, 120 graduated chemists have been on night duty. As the chemists complain that by continuing this system they have been unable to do day service on account of fatigue, the National Union of Chemists' Assistants has petitioned the Ministry of Public Hygiene, that from June 15 there shall be one chemist's shop in every district (Budapest to be divided into twenty districts) where night service is held. The minister of public hygiene agreed to the request, and thus from June 1 the new system will be in force.

Honor to an American

King Francis Josef has conferred on Mr. Nelson O'Shaughnessy, councilor to the Austro-American Embassy in Vienna, the first-class honor signature of the Red Cross.

Popular Lectures on Sanitation

Since November 1, there has been an exhibition in Budapest, devoted chiefly to military and public sanitation. A series of lectures has been announced on sanitary questions of public interest. The topics will include the more important sanitary aspects of public feeding, the physiology of nutrition, the feeding of healthy and sick persons, the different methods of examination of foodstuffs, particularly milk, and the feeding in hospitals. Entrance is free. The exhibition has been crowded from day to day, and the success has been beyond all expectations.

Marriages

EARLE VERNON SHEAFE, M.D., Portland, Ore., to Miss Maria Caldwell Reid of Auckland, New Zealand, at Portland, June 30.

CLARENCE ATWOOD ROSE, M.D., to Miss Myrtle O. Hallamore, both of Bryn Mawr, in Baltimore, June 10, 1914.

FRED HUTCHINSON, M.D., Oil Springs, Ont., to Miss Florence Funkey of East Hancock, Mich., July 14.

FRANK ELLSWORTH STONE, M.D., Linn, Mass., to Mrs. Sarah Jenkins Atwood of Boston, June 19.

GEORGE ALEXANDER ENION, M.D., to Miss Carolyn Banwarth, both of Philadelphia, July 13.

WIRT GOLD BRYAN, M.D., Bisbee, Ariz., to Miss Viola Katherine Snarr of Oolgah, Okla., July 6.

CLAUDE CLEMENT KENNEDY, M.D., to Miss Edyth Louise Tennyson, both of Minneapolis, recently.

ISAAC DAVIS, M.D., Pittsburgh, to Miss Florence Hirschmann of Baltimore, June 27.

JOHN F. FAIR, M.D., Freeport, Ill., to Mrs. Frances G. Footett of Mitchell, S. D., July 6.

J. SHERWOOD JACOBY, M.D., Cushing, Okla., to Miss Haley L. Groom of Wichita, Kan., April 29.

DAN FEURT GRAY, M.D., Ironton, O., to Miss Florence L. Frazer of Columbus, O., July 15.

GEORGE HENRY NEWTON, M.D., to Miss Julia Liberty Davis, both of Fairbury, Neb., recently.

FRED HERMAN MULLER, M.D., to Miss Anna D. Fleer, both of Chicago, July 14.

JOHN HARVE PENIX, M.D., Detroit, to Miss Myra Corbin of Liberty, Mo., July 1.

LOUIS N. LESSER, M.D., to Miss Anna H. Sherline, both of Brooklyn, July 11.

Deaths

Walter Blackburn Dorsett, M.D., one of the most prominent gynecologists and abdominal surgeons of the Southwest; died at his home in St. Louis, July 27, from chronic interstitial nephritis, aged 63. Dr. Dorsett was born in St. Louis County, Missouri. He received his academic training at Washington University and took his medical course in the St. Louis Medical College, from which he was graduated in 1878. He served for a year as an intern in the St. Louis City Hospital and in the summer of 1879, during the epidemic of yellow fever, was made superintendent of the St. Louis Quarantine Hospital. From that time until 1887, he was the chief city dispensary physician, and from 1887 to 1892, was superintendent of the St. Louis Female Hospital. He was a Fellow of the American Medical Association; Chairman of the Section on Obstetrics and Diseases of Women in 1908, and a member of the House of Delegates at seven annual sessions. He had been president of the St. Louis Medical Society, Missouri State Medical Association, St. Louis Obstetrical and Gynecological Society and American Association of Obstetricians and Gynecologists; and was a member of the Medical Society of St. Louis City Hospital Alumni, St. Louis Surgical Society, St. Louis Medical History Club, Surgeons Club of St. Louis, St. Louis Academy of Science, American Association of Railway Surgeons, Western Surgical Society and Southern Surgical and Gynecological Society and Medical Association of the Southwest; he was also delegate from the state of Missouri to the international congress of tuberculosis. Dr. Dorsett's hospital service included the positions of attending gynecologist to the Missouri Baptist Sanitarium and Evangelical Deaconess Home and Hospital and consulting gynecologist to St. Mary's Infirmary, the Rebekah Hospital, and the Alta Vista Hospital, DeSoto, Mo. He had been for many years professor of gynecology and pelvic surgery in the St. Louis University School of Medicine.

Thomas Henry White, M.D. Jefferson Medical College, 1870; aged 69; a Fellow of the American Medical Association; a veteran of the Civil War; local surgeon at Connellsville, Pa., for the Baltimore and Ohio System since 1882; surgeon and trustee to the Cottage State Hospital, and secretary of the board since 1890; medical inspector of the Health Department of Pennsylvania; one of the best known practitioners of Western Pennsylvania; died at his home in Connellsville, July 13, from cerebral hemorrhage.

John Y. Murry, M.D. Jefferson Medical College, 1855; aged 86; a practitioner of Ripley, Miss., since 1849; who volunteered for service in the Mexican War and served as captain in the Confederate Army throughout the Civil War; once president of the Mississippi State Medical Association; for several terms a member of the Mississippi Legislature and treasurer and sheriff of Tippah County; died at his home in Ripley, July 12, from cerebral hemorrhage.

Thomas Sparrow Burbank, M.D. Bellevue Hospital Medical College, 1886; aged 60; formerly a Fellow of the American Medical Association; in 1890 on duty at the U. S. Marine Hospital, Wilmington, N. C.; visiting physician to the City Hospital; for several years a member of the Wilmington Board of Health and at one time a member of the State Board of Medical Examiners; died at his home in Wilmington, July 12.

William Thomas Hamilton, M.D. University of Alabama, Mobile, 1880; aged 66; of Mobile, Ala.; a Confederate veteran; surgeon of volunteers in the Spanish-American War with service in Cuba and the Philippine Islands; for many years quarantine physician in the United States Public Health Service and in the medical department of the United Fruit Company; died in the Touro Infirmary, New Orleans, July 14.

Enos S. Mann, M.D. University of Pennsylvania, Philadelphia, 1895; aged 49; a Fellow of the American Medical Association; formerly of Columbia, Pa., but for the last eighteen years a practitioner of Dallastown, Pa.; who was injured by the breaking of a tent pole in a cyclone which demolished a Chautauqua tent at Dallastown, July 19; died at his home three hours later.

Carl F. Kremer, M.D. University of Greifswald, Germany, 1867; aged 73; a fellow of the New York Academy of Medicine; for forty-seven years a practitioner of New York City and for thirty-three years of that time a member of the staff of the German Hospital; died at his country home in White Plains, N. Y., July 18.

Joseph Henry Shook, M.D. Baltimore University, 1898; aged 44; of Bangor, Pa.; for five years surgeon of the Delaware, Lackawanna and Western Railroad at Nicholson, Pa.; suffered a concussion of the brain in a collision between his automobile and a trolley car at East Bangor, July 12, and died four days later.

George Jacob Dirkes, M.D. College of Physicians and Surgeons in the City of New York, 1890; aged 48; a member of the Medical Society of the State of New York; consulting physician to the Brooklyn Eastern District Hospital and Dispensary; died at his home in Brooklyn, July 19.

George Morris Dillow, M.D. College of Physicians and Surgeons in the City of New York, 1875; aged 68; emeritus professor of renal diseases in the New York Homeopathic Medical College and a member of the staff of Flower Hospital; died at his home in New York City, July 13.

William Milton Dumm, M.D. Johns Hopkins University, Baltimore, 1912; aged 29; assistant gynecologist at Johns Hopkins Hospital, Baltimore; a native of Cheyenne, Wyo.; was accidentally drowned July 12, while attempting to swim ashore from a canoe anchored near Sparrows Point.

William J. Hanlon, M.D. Medico-Chirurgical College of Philadelphia, 1895; aged 52; of Mount Carmel, Pa.; a member of the Medical Society of the State of Pennsylvania; died in the Medico-Chirurgical Hospital, Philadelphia, July 11, from cerebral hemorrhage following chronic nephritis.

Oswald W. Hacker, M.D. Medical College of Virginia, Richmond, 1909; aged 39; a member of the Medical Society of Virginia; formerly of Roanoke, Va.; a specialist on diseases of the eye, ear, nose and throat; died at his home in Wyomissing, Pa., July 15, from acute meningitis.

James Farrell McDermott, M.B. Royal University of Ireland, Dublin, 1906; aged 37; surgeon of the Cunard Steamship *Lusitania*; was drowned when that steamer was torpedoed off the Irish Coast by a German submarine, May 7. His body was recovered seven days later.

John Berkeley Goines, M.D. Meharry Medical College, Nashville, Tenn., 1895; aged 54; a colored practitioner of Louisiana, Mo., for twenty years; member and medical examiner for the Medical Aid Association of Louisiana; died at his home, July 14, from tuberculosis.

Joseph Sherrill Leech, M.D. University of Louisville, Ky., 1881; aged 57; a member of the Kentucky State Medical Association; for more than ten years mayor of Glasgow; also senior partner in a drug firm; died at his home in Glasgow, July 10, from dysentery.

George Henry Jenks, M.D. Hahnemann Medical College, Philadelphia, 1875; aged 75; also a clergyman of Los Angeles; died in a hospital in Los Angeles, April 30, from the effects of mercuric chlorid, self-administered, it is believed with suicidal intent.

William E. Harris, M.D. University of Tennessee, Nashville, 1882; aged 60; for more than thirty years a practitioner of Oran, Mo.; who had spent the last year in Texas in efforts to improve his health; died at his home in Oran, July 10, from tuberculosis.

Winfield Beck Shepherd, M.D. University of Michigan, Ann Arbor, 1910; aged 30; a Fellow of the American Medical Association and for a year an intern in the Samaritan Hospital, Philadelphia; died at his home in Philadelphia, July 13.

Aaron B. Terrill, M.D. State University of Iowa, Iowa City, 1881; aged 72; of Manchester, Iowa; state superintendent of Sunday Schools; who left two months ago for a trip to the Pacific Coast; died in Berkeley, Calif., July 14.

Heman S. Rockwood, M.D. University of Vermont, Burlington, 1871; a veteran of the Civil War; a well known practitioner of Franklin and St. Lawrence counties, N. Y.; died at his home in Bombay, N. Y., about July 7.

John W. Corrigal, M.D. Queen's University, Kingston, Ont., 1909; aged 35; of Limerick, Sask.; a member of the Saskatchewan Medical Association; died in Weyburn, Sask., April 12, from empyema, following pneumonia.

Gustavus E. Berquist, M.D. University of Louisville, Ky., 1877; aged 62; a pioneer practitioner of McPherson County, Kan., and for thirty-three years a resident of Lindsborg, Kan.; died at his home, July 12.

Everett D. Kemp, M.D. State University of Iowa, College of Homeopathic Medicine, Iowa City, 1901; aged 41; a veteran of the Spanish-American War; died at his home in Denison, Iowa, about July 15.

Charles Shupe, M.D. University of Buffalo, 1877; aged 68; for two terms medical health officer of Attercliffe Station, Ont., and local railway surgeon; died at his home, May 6, from cardiac asthma.

Lawrence Ben Bitz, Jr., M.D. St. Louis University, 1910; of Pensacola, Fla.; aged 35; also a graduate in law; died at the home of his parents in Evansville, Ind., July 10, from tuberculosis.

Thomas W. Sparks, M.D. Meharry Medical College, Nashville, Tenn., 1892; aged 52; a colored practitioner of Terrell, Texas; while in his office, July 14, was shot and instantly killed.

Andrew Jackson Dispennett, M.D. Bennett Medical College, Chicago, 1877; aged 79; one of the oldest practitioners of Kalamazoo, Mich.; died at his home in that city, July 5.

Edward C. Pearson, M.D. University of Louisville, 1873; aged 70; of Knoxville, Ala.; a Confederate veteran; died in the old Alabama Soldiers' Home, Mountain Creek, July 4.

Robin Adair Eshenour, M.D. Syracuse (N. Y.) University, 1913; aged 27; of Jordan, N. Y.; was drowned, July 4, while swimming in Cross Lake, near Waterloo, N. Y.

William Robert Moore, M.D. University of Tennessee, Nashville, 1891; aged 55; died at his home in Greenfield, Tenn., May 18, from cerebral hemorrhage.

Warner Julian Bailey, M.D. University of Alabama, Mobile, 1872; aged 76; of Laurel, Miss.; died at the home of his son in Meridian, Miss., June 29.

Charles Edward Kuster, M.D. Rush Medical College, 1865; aged 72; formerly of Terre Haute, Ind.; died at his home in Los Angeles, July 3.

Melville Turner, M.D. Vanderbilt University, Nashville, Tenn., 1882; aged 57; died at his home in Jasper, Tenn., July 5, from nephritis.

Jacob DeCou (license Michigan, 1900); aged 80; an advertising cancer specialist of Detroit; died at his home, July 8, from heart disease.

Lucius Auld, M.D. Trinity Medical College, Toronto, 1888; aged 48; died at his home in Buffalo, July 9, from heart disease.

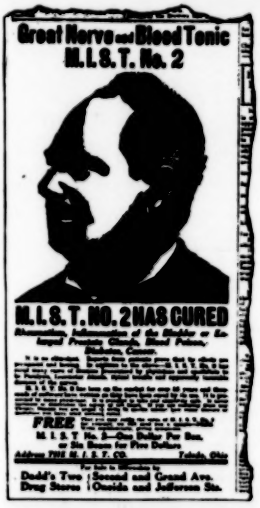
The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

M. I. S. T. NO. 2

"M. I. S. T. No. 2" is put on the market by the M. I. S. T. Co., Toledo, Ohio, a concern which seems to have for its president one S. B. Murray and for its general manager, R. M. Murray. M. I. S. T. is said to mean "Murray's Infallible System Tonic" and is characterized by its exploiters as "The Only Scrofula, Catarrh, Blood, Liver and Kidney Medicine on Earth."

M. I. S. T. is advertised under claims whose palpable fraudulence and glaring mendacity really belong to the past decade of medical swindles. Few "patent medicines" on the market today seem to be willing to go the limit in their falsifying that is attained by the exploiters of M. I. S. T. The M. I. S. T. Company fabricates with the easy abandon of one who, knowing he is beyond the pale of decency, seems to glory in the fact. The concern advertises that it authorizes its agents to "guarantee" that:


Great Nerve and Blood Tonic
M. I. S. T. No. 2
M. I. S. T. NO. 2 HAS CURED
FREE
Dodd's Two | Second and Grand Ave.
Drug Stores | Omaha and Jefferson Sts.

A typical advertisement (greatly reduced) of the "M. I. S. T. No. 2" fraud.

"Six to ten boxes of M. I. S. T. No. 2 will cure and remove entirely from the system Cancer and Cancerous germs."

"Six boxes of M. I. S. T. No. 2 will cure all primary and secondary forms of Blood Diseases."

"Six boxes of M. I. S. T. No. 2 will cure any case of Diabetes."

Nor is this all:

"M. I. S. T. No. 2 has cured many cases of Paralysis, Locomotor Ataxia, Spinal Trouble and apparently incurable diseases of the Nerves."

"M. I. S. T. No. 2 will cure any case of Catarrh on earth . . . Also Bronchitis, Asthma and diseases of the Lungs and Stomach, Enlargement of the Spleen, Leucorrhoea, Suppressed and Profuse Menstruation and all Uterine complaints."

Apparently, there are two products, "M. I. S. T." and "M. I. S. T. No. 2," the latter, it seems, being by far the more widely advertised. The Michigan Dairy and Food Department, which has reported in its bulletin on "Fakes and Frauds" the result of a qualitative examination of M. I. S. T., states that that preparation contains aloes, cascara and licorice.

M. I. S. T. No. 2 comes in the form of brownish-black cylindrical masses each enclosed in a gelatin capsule. The masses have an odor of wintergreen and licorice and are bitter to the taste. They weigh about 5 grains each. The trade package contains thirty-one capsules and sells for $1. An original package of M. I. S. T. No. 2 was purchased and subjected to analysis in the Chemical Laboratory of the American Medical Association. The chemists reported, in part, as follows:

CHEMISTS' REPORT

Qualitative tests on M. I. S. T. No. 2 Nerve Tonic demonstrated the presence of aloes, metallic mercury (probably

introduced in the form of blue mass), powdered glycyrrhiza, powdered althea, starch, traces of calcium, a phosphorus compound, oil of wintergreen and a little sand. Zinc phosphid and nux vomica, two remedies which are frequently put into nostrums for the treatment of "lost manhood," were absent. Iodids and salicylates (except traces of oil of wintergreen), phenolphthalein and the saline purgatives were absent. Soap was not present in appreciable amounts. Cascara was not found. A quantitative determination of mercury was made and about 4 per cent. found. From this it is apparent that M. I. S. T. No. 2 Nerve Tonic is essentially an aloes-mercury mixture and whatever therapeutic power it may possess must be due principally to these drugs.

Here, then, we have what is essentially a mixture of blue mass and aloes sold as a cure for cancer, locomotor ataxia, paralysis, diabetes, suppressed and profuse menstruation and a host of other conditions. That such a mixture possesses the therapeutic properties of mercury and aloes is, of course, true. That it possesses the properties assigned to it by its exploiters is unqualifiedly false. The danger of self-treatment in syphilis is great enough at any time but when syphilitics attempt to treat themselves with nostrums whose composition is secret and the claims for which are fraudulent, the risks are enormously increased. And that risk is not confined to the individual but extends to the community. The sale of this iniquitous nostrum, "M. I. S. T. No. 2," is a menace to public safety and the methods by which it is exploited are an offense to public decency.

CALDWELL'S SYRUP PEPSIN

Caldwell's Syrup Pepsin is manufactured by the Pepsin Syrup Company of Monticello, Ill. This concern seems to have, or have had, for its directors:

ALLEN F. MOORE, president
JOHN F. HOTT, vice-president
R. E. THOMPSON, secretary
EUGENE KATZ
W. B. CALDWELL, M.D.

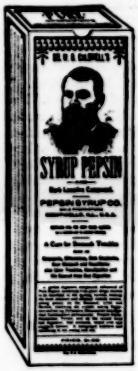
Some of the claims made for this preparation are:

"Positive Relief for Constipation."

"The Great Digestive Preparation, the Most Pleasant and Effective Remedy Known, Acting Gently, yet Promptly, on the Stomach, Liver and Bowels."

". . . the most convenient, agreeable and acceptable form of a digestive compound known."

"Dispels Colds, Headache, Fevers and all ills caused from Bad Digestion, Foul Stomach, Torpid Liver and Sluggish Bowels."



Throughout the advertising the idea is conveyed that Caldwell's Syrup Pepsin possesses peculiar value because of the alleged presence of the pepsin in it. For instance, the circular which is wrapped around each bottle reads:

"The natural demand for a digestive preparation in conjunction with a prompt and effective laxative has led to the compounding of pepsin, the greatest digestant of the age, with mild and effective laxative drugs, containing the virtues of plants known to be the most beneficial to the human system. To combine pepsin with vegetation [*sic*] to make the most effective remedy and meet with the best results has led to the manufacture of the popular remedy, Dr. Caldwell's Syrup Pepsin and Herb Laxative Compound."

The label on "Syrup Pepsin" declares the presence of 8½ per cent. alcohol. The government chemists have already passed judgment on this product and their opinion has become a matter of public record. In the hearings before the Committee of Interstate and Foreign Commerce of the House of Representatives relating to the Food and Drugs Act, published in 1912, Dr. L. F. Kebler, Chief of the Division of Drugs of the Bureau of Chemistry of the Department of Agriculture classes Syrup Pepsin among "Products for which False or Fraudulent Claims are Made." Regarding its composition Dr. Kebler stated:

"An aqueous-alcoholic solution containing laxatives flavored with oil of peppermint. Pepsin is absent or not present in appreciable amounts."

THE JOURNAL of the American Medical Association has received inquiries at various times concerning the laxative constituents of "Syrup Pepsin" and it seemed worth while to determine the nature of the laxatives in the nostrum. Accordingly the Association's laboratory examined a specimen and reported:

"Qualitative tests indicated the presence of a senna preparation as the chief laxative ingredient. Phenolphthalein was absent but the presence of small quantities of a salicylate, probably sodium salicylate, was noted" (Reports Chem. Lab. A. M. A., 1914, p. 80).

Taking the results of the federal chemists with those of the Association's laboratory, it seems that Caldwell's Syrup Pepsin is essentially a laxative of the senna type. The lack of any appreciable quantity of pepsin as reported by the federal authorities would seem to indicate that the name would constitute misbranding under the federal Food and Drugs Act.

Correspondence

Ben Franklin's Views

To the Editor:—I have read with interest the letter of Dr. Diller with its illuminating discussion of Benjamin Franklin's contributions to medicine (THE JOURNAL, July 10, 1915, p. 189). My object in writing to THE JOURNAL was chiefly to direct attention to the inconsistency in Franklin's habits and practice as contrasted with the condemnation of malt liquors contained in the extract of his autobiography published in THE JOURNAL, June 5, 1915, p. 1933. This inconsistency Dr. Diller does not question, nor can it be explained away. The brewing interests of the country, rightly concerned over the growing attitude of disfavor as regards the use of alcohol, have been exploiting the views of Franklin in the newspapers in an effort to increase the consumption of their product. Both Franklin and John Hancock have been represented as championing the cause of the brewers.

I thought I was well within the limits of moderation and understatement in regretfully referring to the maxims of Poor Richard as "archaic," and I am glad to learn that there are parts of this country where they are still honored and esteemed and—I hope—practiced. The Pittsburgh millionaire whom we know and love in New York is not exactly an exemplar of the frugal virtues and the simple life, but he is probably different in his home town. In New York, Poor Richard's philosophy is not only archaic, it is obsolete almost to the point of lacking antiquarian interest. Franklin's niggardly maxims have no show at all in the prodigal atmosphere of the white lights of Broadway. Even their language would hardly be understood by the modern Gothamite.

When you incline to have new clothes, look first well over the old ones and see if you cannot shift with them another year, either by scouring, mending or even patching if necessary.

Thus attired, Poor Richard could not today get a job in New York or Chicago.

Many a little makes a mickle.
Beware of little expenses; a small leak will sink a great ship.
It is as truly folly for the poor to ape the rich as for the frog to swell in order to equal the ox.
Great estates may venture more,
But little boats should keep near shore.
The second vice is lying, the first is running into debt.
Those have a short Lent who owe money to be paid at Easter.
Rather go to bed supperless than rise in debt.

I am afraid Poor Richard, if he came to New York, would be regarded as a cheap and rather mean type of tightwad. We are no longer oppressed and made uncomfortable by his morbid dread of debt. In Wall Street, readiness to borrow and spend is fairly considered one of the first attributes of financial ability and future greatness. In New York, those

of us who do not live in tenement houses or hotels occupy houses mortgaged to the limit. These mortgages we never intend to pay. When we need a new or better automobile, we not infrequently obtain the money for it by placing a second mortgage on our homes at a higher rate of interest. Let not Dr. Diller quote the aphorisms of Poor Richard on Manhattan Island. *Nous avons changé tout cela!*

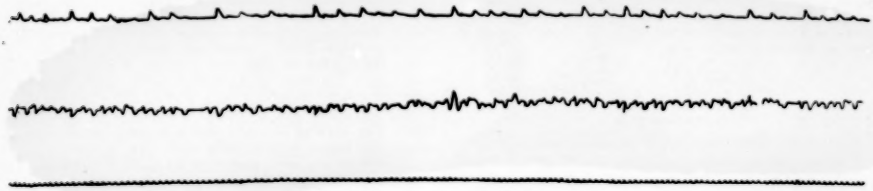
Probably the most remarkable and original contribution of Franklin to medicine was his early recognition of the value of fresh air in health and disease. His campaign for the most part, however, fell on deaf ears. His contemporaries were a stiff-necked generation, and in their fear of drafts they almost unanimously approved the sentiment contained in the old couplet:

When the wind blows through a hole,
May God have mercy on your soul!

HENRY L. SHIVELY, M.D., New York.

Auricular Fibrillation and Pulsus Alternans

To the Editor:—Dr. Harold E. B. Pardee (The Prognosis of Auricular Fibrillation, THE JOURNAL, June 19, 1915, p. 2057) uses the following phrase in his concluding sentence: "the irregularity, per se, adds little or nothing to the gravity of the prognosis." According to Lewis, the irregularity of the pulse of auricular fibrillation is the most common of the seven different varieties of arrhythmic pulse, and, of course, one of the gravest.



Tracing in a case of arrhythmia.

That the irregularity, per se, has nothing to do with the prognosis is well exemplified in the following case: A man, aged 58, has had this type of irregular pulse since he was 33. He has no valve lesion, dilatation or other muscle disease or weakness; he has had no dyspnea or decompensation. There is no history of infectious disease, such as rheumatism, which might damage the conductivity and integrity of his heart muscle. Three times he was passed in life insurance examination by competent doctors. For years he suffered from chronic diarrhea. He is thin and spare, but is very active and in good health. His pulse rate is generally above 80, always irregular; there is always pulse deficiency, the apex beat being more frequent than the radial pulse. For years he was a surveyor and was able to climb mountains, carrying instruments, and suffered no discomfort. Since his type of irregularity conforms to but one form of the seven various kinds, and that auricular fibrillation, it must be this from the character of the tracing herewith shown.

Since he has never taken digitalis, it is impossible to say whether this drug could sufficiently dominate (depress) the conductivity of the bundle of His, so as to render the pulse regular.

In some ways this perpetual arrhythmia corresponds to Mackenzie's rhythm, a form of irregularity no longer considered a distinct variety of arrhythmia by Lewis.

Dr. Caroline McGill (The Determination of Pulsus Alternans by the Sphygmomanometer, THE JOURNAL, June 19, 1915, p. 2061) rightly credits Dr. J. B. Herrick with the discovery of this valuable clinical test.

The prognosis of pulsus alternans is always grave in cases of myocarditis, and Lewis states that that is the only form of irregularity of the pulse which cannot be detected without the use of tracings or the electrocardiograph.

I can confirm all that Drs. Herrick and McGill say about the usefulness and simplicity of the method, since I have employed it for about a year in many cases. This irregularity is commoner than supposed, and can be detected without complicated apparatus.

No one with pulsus alternans can endure a major operation, as the condition is always grave and the patient is constantly in jeopardy. Merely palpating the radial artery and listening to the heart will not make the diagnosis. The pulse may be strong, the heart beats forcible and regular to the ear, and yet an operation will be followed by disastrous results.

By blocking off all the beats in the radial artery by inflating the cuff on the arm and then by deflation slowly, only the strong beats come through to the radial, while the weak ones are still blocked off; halving of the pulse rate, previously counted, permits making a diagnosis. The method is simple and should be employed by all clinicians.

Dr. Herrick might have mentioned that pulsus alternans cannot always be found in one, subject to this complaint. The alternations follow an extrasystole or are produced by exercise. This irregularity is often found with high blood pressure, angina pectoris, nocturnal asthma and Cheyne-Stokes respiration.

In 1905, Dr. James Mackenzie noted pulsus alternans in a man, and made a tracing of his pulse; by using the cuff in the method described by Dr. Herrick, he was able to block off the weak beats and allow the strong ones to be registered by the tambour. This is well shown on page 405 of the third edition of his book.

Mackenzie makes no mention of the practical bedside detection of pulsus alternans by the auscultation of the brachial or palpation of the radial, using the cuff, as employed by Dr. Herrick, and to the latter belongs the credit of directing the attention of the profession to this test.

The fact that fibrillation of the auricle exists is not itself sufficient to prevent a major operation. Recently Dr. John B. Deaver removed the half of an exophthalmic goiter in a woman who had suffered from fibrillation for years and with chronic nephritis, very successfully and with much benefit to the patient.

ROBERT L. PITFIELD, M.D., Philadelphia.

Public Menaces

To the Editor:—I was interested in the communication (THE JOURNAL, July 17, 1915, p. 272) concerning the cigar cutter. There is another public menace which ought to be called attention to, and that is the use of the hand lever commonly seen in public urinals. This lever is used to flush the bowl. Above the lever are the words, "Please push down after using." A person with gonorrhea, after handling the penis during micturition, pushes down on the lever with the same hand that held the infected penis. Thus, during a short period of time, many persons are needlessly exposed, unless they are aware of the danger and act accordingly.

FRANK E. LEWIS, M.D., Newton, Mass.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

TREATMENT OF CHLOASMA

To the Editor:—Kindly let me know an efficient method for treating chloasma. I refer to those types that may have had their origin during pregnancy, but have been persistent in remaining.

LEE W. PAUL, M.D., Ilwaco, Wash.

ANSWER.—The mechanism regulating pigment formation in the skin is entirely unknown. That there is such a mechanism is indicated by the disturbances of pigmentation which appear without any demonstrable cause, and which occur in association with pregnancy, with diseases of the suprarenal glands, and occasionally with various tumors in the abdomen and pelvis. These cases of chloasma associated with pelvic and abdominal conditions are vaguely explained as being due to disturbances of the abdominal sympathetic nervous system. They are undoubtedly due to disturbances of some mechanism in the abdomen and pelvis, but that it is the sympathetic nervous system is in large part a surmise.

In the face of so obscure an etiology, there is no rational method of systemic treatment. The most that can be done is to make an effort to overcome such uterine and other pelvic or abdominal sources of irritation as may be manifest. But, truth to tell, such systemic treatment directed to the relief of chloasma is usually entirely futile.

We are left to local methods of treatment, and the best that local methods of treatment can do is to get rid of the pigment temporarily. The increased pigment in these patches is situated in the lower part of the epidermis, and this pigment can be removed by the use of applications which cause deep exfoliation of the epidermis. The commonest application is a solution of mercuric chlorid, from 1:500 to 1:250. Three or four layers of gauze are cut to correspond in shape to the patch to be treated. After being wet with this solution, this layer of gauze is applied to the surface until distinct irritation is produced. If one application does not produce sufficient exfoliation of the skin, the applications may be repeated until there is an acute dermatitis which will be followed by profuse exfoliation of the epidermis. Solutions of salicylic acid in alcohol, one-half dram or a dram to the ounce, may be used in the same way. To subdue the irritation after it has been excited by these applications, the surface should be greased several times daily with cold cream, or zinc ointment, or some similar bland ointment.

NERVE-BLOCKING

To the Editor:—What is the present status of nerve-blocking for surgical operations?

C. W. LONGENECKER, M.D., Kingman, Kan.

ANSWER.—Nerve-blocking has become a well-established and successful method of producing anesthesia for surgical operations. Like most other methods of inducing anesthesia, it has its limitations; but its field of usefulness is constantly increasing with experience and better technic. Whenever nerve trunks supplying the field of operation can be successfully reached by the blocking fluid, painless operations can be performed, and in many cases in which individual nerve trunks cannot be reached, painless operations can be done by proper peripheral infiltration.

The advantages of the method over general anesthesia in suitable cases are so conspicuous that it is certain to grow in use and popularity.

COMPARATIVE VALUE OF CHLORINATED LIME AND FERROUS SULPHATE AS DISINFECTANTS

To the Editor:—Kindly give the relative merits of ferrous sulphate and chlorid of lime as disinfectants for toilets, privies, etc. How much chlorin is there actually present in the commercial product, chlorid of lime?

S. B. WELD, M.D., Becket, Mass.

ANSWER.—Ferrous sulphate is odorless and a good deodorant, but a feeble disinfectant or germicide. Chlorinated lime (chlorid of lime) is less efficient as a deodorant and gives off an unpleasant odor itself, but is an efficient germicide, used particularly for the disinfection of sewage and water. The present pharmacopeia calls for 35 per cent. of available chlorin in chlorinated lime; in the forthcoming edition, we understand, the percentage is to be reduced to 30. The commercial product is extremely variable in chlorin content.

Book Notices

GESCHICHTE DER AUGENHEILKUNDE. Von Dr. J. Hirschberg. Drittes Buch, Zehnter Abschnitt—Englands Augenärzte 1800 bis 1850. Paper. Price, 24 marks. Pp. 483, with 30 illustrations. Leipzig: Wilhelm Engelmann, 1915.

This work forms part of the second edition of that remarkable "Handbuch der gesamten Augenheilkunde" which, begun in 1898, is not yet finished. The present contribution to that encyclopedic treatise forms only a small part of the author's "History of Ophthalmology from the Earliest Times to the Present Day," and some idea of the enormous amount of labor expended on it by the venerable and erudite writer is gained by referring to the fact that his as yet uncompleted task began with Part 4 in 1899, was continued through many other parts, and already fills 2,793 pages! Fortunately, this protracted and detached method of publication does not materially affect Professor Hirschberg's subject, because the facts of history—unlike for example, the theories of bacteriology and pathology—do not grow stale in fifteen or twenty years.

The present portion of the history hardly equals in merit the author's previous contributions. This failure is probably the fault of British ophthalmologists themselves, because, as Hirschberg explains in his preface, "the people who added so much to our knowledge of the eye and its diseases do not seem to have found time to write much about themselves!"

Hirschberg is unfortunate in the title of his monograph, because under the caption "England," he includes Ireland, Scotland and other components of the British Isles, and has thrown in for good measure the remainder of the empire. It is as if an Englishman had given us an account of German medicine under the caption "Prussia's Physicians."

The author seems to have drawn liberally from Hirsch's Lexicon, and we presume the reason this prolific source of information is so little acknowledged by Professor Hirschberg is that he felt at liberty to use, as his own, the material gathered by a writer on the same subject in the first edition of the Handbuch.

A good deal of padding has also been resorted to by including descriptions, more or less complete, of men and activities that properly belong to decades after 1850, not to mention the inclusion of a number of subjects strictly pertaining to the United States. As examples of the former fault, there are included men like T. Pridgin Teale, Jr., who is still living, and who did not enter the medical profession until 1855; Thomas Shadford Walker, who did not begin to practice till 1858, and George Edward Walker, who was not born until 1840.

But Professor Hirschberg's literary sins of commission are not so noticeable as his errors of omission. Of important ophthalmologists whose work was wholly, or almost entirely performed within the period (1800-1850) which the author nominally assigns to himself, the following may be mentioned: Henry Gray (1825-1861) received in 1849 the triennial prize of the Royal College of Surgeons of England for his essay "On the Anatomy and Physiology of the Nerves of the Human Eye," one of the most highly original and valuable of all English contributions to ophthalmology. The omission of this well-known writer's name is all the more striking because the great majority of English and American surgeons have obtained their knowledge of the anatomy of the eye (as well as of anatomy in general) from that great English textbook, Gray's "Anatomy, Descriptive and Surgical."

The life of John Harrison Curtis, although adequately sketched in the American Encyclopedia of Ophthalmology, is not even referred to by Hirschberg. He was born in 1778, was a man of great influence both in Britain and on the continent, and in 1833 wrote his masterpiece, "A Treatise on the Physiology and Diseases of the Eye."

Henry Edward Eastlake, an important obstetrician and ophthalmologist, a Ph.D. of Heidelberg, as well as a fellow of Kings' and Queens' College of Physicians, Dublin, is absolutely omitted by Hirschberg; George H. Fielding, F.R.S., well known in his day, published (about 1832) several impor-

tant monographs on ophthalmic subjects; William Sharpey (1802-1880), celebrated oculist, described (1835) a number of original and relatively important experiments on the eye, including "An Account of the Discovery by Purkinje and Valentin of Ciliary Motions," and made numerous observations on the eyes of mammals and reptiles; yet his name is not even mentioned by the author.

Robert Crawford Mayne (1811-1864), F.R.C.S., wrote the very creditable article on "The Optic Nerve," in Todd's Cyclopedia, but Hirschberg passed him by; William Newnham, F.R.C.S., born 1790, wrote on "Melanosis of Eyeball," etc., but was also overlooked!

Hugh Neill was one of the most famous British ophthalmologists and otologists. For several years, beginning with 1834, he issued a series of valuable "Reports of the Liverpool Eye and Ear Infirmary." He also published (London, 1848) a monograph "On the Cure of Cataract with a Practical Summary of the Best Modes of Operating, Continental and British," and numerous journal articles, and yet we look in vain for mention of him or his important contribution to ophthalmic science; John Hatch Power (born 1806) of the Royal College of Surgeons, professor of anatomy (later of surgery) at Dublin, a celebrated operator on the eye, and author of "On the Structure of the Optic Nerve in Relation to Reversed Retinal Vision," is altogether omitted by Hirschberg. This omission is all the more striking, as Power was also author of the world-renowned "Surgical Anatomy of the Arteries." All that Hirschberg deigns to say about Sir David Brewster, to whom ophthalmology owes so much, and who was one of the most distinguished physicists of all the ages, is contained in one single sentence (page 399), and this in the face of the important part which the stereoscope (the invention of this talented Scotch scientist) even now plays in the office of every oculist, to say nothing of Brewster's numerous other optical discoveries, such as the kaleidoscope, the laws of polarization by reflection and refraction, the laws of metallic reflection, the connection between the refractive index and the polarizing angle, etc. Compare this one poor sentence with the pages of wordy and frequently irrelevant adulation devoted to Albrecht Haller in the same author's "Deutschland." Charles Wheatstone is treated even more cavalierly, Hirschberg recording merely that Nunnely mentions the fact that Wheatstone discovered (as he certainly did!) the reflecting stereoscope. The author does not consider it worth while to give separate mention to Wollaston (1804), the inventor of periscopic lenses, but disposes of him, very incidentally, under the sketch of W. Mackenzie, in just five words. Wollaston not only discovered periscopic lenses (a discovery which should have had some attention paid to it), but in 1802 he also wrote the extremely valuable "A Method of Examining Refractive and Dispersive Powers by Prismatic Reflection." Finally, not to weary the reader with too many instances, we cannot find any reference, in these verbose pages, of the man—George Airy—who first fitted a cylindrical lens for astigmatism. One would certainly expect to find at least a mention of this wonderful man and his epoch-making discovery, but this very reasonable expectation, like scores of others, is doomed to be disappointed.

Those portions of the British Empire known to be of little or no ophthalmic importance before 1850, Hirschberg treats in a most peculiar fashion. For example, Canada is dismissed in three quarters of a page by entirely ignoring, *inter alia*, the activities of Henry Howard, who in 1850 published at Montreal one of the earliest and one of the best textbooks on ophthalmology—"Anatomy, Physiology and Pathology of the Eye"—in which he describes and pictures several original devices; also Frank Buller (1844-1905), a pupil of von Graefe and Schöler, whose eye shield in gonorrheal ophthalmia and other contributions to ophthalmic surgery are well known wherever that science is studied. On the other hand, he does give a perfunctory account of those Canadian colleges in which ophthalmology is *now* taught, and adds the names of the *present* teachers in these institutions, hardly one of whom saw the light until long after 1850.

Just what the issues of the Great War have to do with a history of British ophthalmology in the first half of the nineteenth century, it is difficult for us to imagine—certainly Hirschberg throws no light on the mystery—but he does not hesitate to drag them into a book already swollen by irrelevant padding. This overzealous son of the Fatherland cannot resist the temptation to play the part of political propagandist in a *Nachwort* that is not only an exhibition of exceedingly poor taste, but is, to say the least, a doubtful tribute to the men whose life work he so ably describes and whose memory he has helped to preserve. We sincerely wish, for the sake of the venerable author, that the editor of the Handbuch had been wise enough to draw a firm but kindly blue pencil through the page in question.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN. For Use of Students and Practitioners. By Oliver S. Ormsby, M.D., Professor and Head of the Department of Skin and Venereal Diseases, Rush Medical College (in Affiliation with the University of Chicago). Cloth. Price, $6 net. Pp. 1168, with 342 illustrations. Philadelphia: Lea & Febiger, 1915.

Ormsby's work must inevitably be looked on as a successor to the well-known treatise by Drs. Hyde and Montgomery; he, if any one, embodies the traditions of those authorities. While the preface acknowledges considerable indebtedness to that text, the material has been so recast in the light of the writer's later experience, and such thorough consideration has been given to recent advances in dermatology, that there is nothing suggestive in this book of a mere revision of the older one. An occasional resemblance to Dr. Hyde's distinctive diction and usage and a few familiar plates are the most evident links connecting the author's work with that of his predecessors.

The work has been written with especial insight into the difficulties which dermatology presents to the student and to the practitioner, and much attention has accordingly been given to the introductory chapters. Here the author is at his best. These chapters may be read with interest and profit by both the general medical reader and the expert dermatologist. A notable point in the introduction is a complete outline in topical form for a thorough routine dermatologic examination. It furnishes a plan of examination which can be well adopted by the beginner in dermatology and will prove very useful to the practitioner in working out his dermatologic cases.

The body of the work has been carefully planned and the various dermatoses fully considered. An accurate description of the elementary lesions is given, and sharp emphasis laid on distinctive points in the case of most dermatoses. Two especially good sections are those on the trichophytic organisms and on syphilis. The account of syphilis—that most difficult subject to write on at present—is well balanced, comprehensive and sane. There is an especially serviceable digest of modern methods of treatment of this disease.

To the author's colleagues it must remain a source of regret that he did not attempt to define some dermatologic conditions in more definite and comprehensive terms than by mere condensation of the symptomatology. While the views of an investigator on problems of dermatologic classification properly appear in monographs rather than in textbooks, the time is surely ripe for freer and more original discussions of such matters in reference books. Such discussions perform the invaluable function of giving a dynamic quality to the author's presentation, and enlist and stimulate the interest of the student in corresponding degree.

The design and appearance of the book are excellent. The volume is not too bulky, the paper is well suited for illustrations, and the half-tone figures are clear. It is to be regretted that the author or his publishers have yielded to the blandishments of colored plates. The inferior equipment for color reproductions at the command of American publishers, and the extraordinary difficulty of doing justice to skin diseases in this medium, make our attempts at colored illustrations of dermatoses of little value.

On the whole, the author has successfully performed a laborious and difficult undertaking; he has written an excellent text on dermatology.

A WORK ON SPECIAL DENTAL PATHOLOGY. Devoted to the Diseases and Treatment of the Investing Tissues of the Teeth and the Dental Pulp, Including the Sequelae of the Death of the Pulp; Also, Systemic Effects of Mouth Infections, Oral Prophylaxis and Mouth Hygiene. By G. V. Black, M.D., D.D.S., Sc.D., Professor of Operative Dentistry, Northwestern Dental School. Cloth. Price, $6. Pp. 476, with 518 illustrations. Chicago: Medico-Dental Publishing Co., 1915.

This volume will stand alone in dental literature for a long time, and will place the histopathology of the investing tissues of the teeth on a basis of scientific equality with standard volumes on other highly specialized tissues. The complexity of dental tissues is illustrated both by descriptive text and by photomicrographs. The volume is the crowning touch to a lifetime spent in a thoroughgoing, exact study of dental tissues. One is at once impressed with the scholarship of the author. The freedom of the work from the blind faith in drugs is wholesome and refreshing. The author studies in detail the gums and gingivae, cementum, peridental membrane and alveolar process, and in these studies develops a new nomenclature. Several pages are devoted to a study of saliva and salivary calculus. The chapters on gingivitis are notable. One hundred pages are devoted to the histology, physical functions and diseases of the dental pulp. Acute and chronic alveolar abscess, with sequelae, receives appropriate treatment. The closing chapters are devoted to oral hygiene, oral prophylaxis and examination of the mouth, the latter by Dr. A. D. Black. A careful study of the book reveals the fact that the author's interest in the gums and peridental membrane is paramount, although the work is splendidly balanced. Taken as a whole, it may properly be considered the most comprehensive and satisfactory text on the subject in print.

OPERATIVE GYNECOLOGY. By Harry Sturgeon Crossen, M.D., F.A.C.S., Associate in Gynecology, Washington University Medical School. Cloth. Price, $7.50. Pp. 670, with 770 illustrations. St. Louis: C. V. Mosby Company, 1915.

This book is a comprehensive work on operative gynecology, discussing the standard operations used today in work on the female generative organs. The author describes the various operations clearly and concisely, and numerous accompanying plates are excellent. The steps in the various operations are adequately illustrated so that they may be followed without difficulty. Each chapter is complete. The author's individuality is clearly shown, and to this he has added the best work of the various American and foreign authors. His book is a valuable one.

Miscellany

Organization of Medical Brotherhood

The following statement has been issued by Dr. S. J. Meltzer, president:

An appeal to the men and women engaged in medical practice and the advancement of the medical sciences:

The present horrible war among civilized nations has brought out impressively certain sad facts: that although there are civilized individual nations, we are still very far from having a civilized humanity—there is an abyss between intranational and international morality; that, no matter how cultured and enlightened nations may be, they still settle their international differences by brute force, by maiming and killing their adversaries and, finally, that the present high development of science and invention in individual nations only serves to make the results of this war more destructive than any other in history.

The war has demonstrated, however, one encouraging fact, namely, that among all the sciences and professions, the medical sciences and medical practice occupy an almost unique relationship to warfare, and that, among all the citizens of a country at war, medical men and women occupy a peculiar and distinctive position.

No discovery in medical science has been utilized for the purpose of destroying or harming the enemy. Medical men in each of the warring countries are as courageous, as patriotic, as any other citizens, and are as ready to die or to be crippled for life in the service of their country as any other class of their fellow countrymen. But their services consist in ministering to the sick and to the injured and in attending to their sanitary needs. Furthermore, they often risk their lives by venturing into the firing line to bring the injured to places of safety and to attend to their immediate needs. In these heroic and humanitarian acts, friend and foe are treated alike. Finally, the majority of the members of the medical profession and of the medical journals of the neutral as well as of the warring countries abstain from public utterances that might be grossly offensive to any of the belligerent nations.

These facts—this advanced moral position in international relations which medicine and its followers are permitted to occupy in all civilized nations—ought to be brought to the full consciousness of the men and women engaged in the medical sciences or in medical practice. Such a realization could not fail to have an elevating influence on the medical profession itself, and would probably exert a favorable influence on the development of international morality in general.

At the dawn of history, medical men were frequently also the exponents of philosophy and morals. In the middle ages, when knowledge became specialized, medical men more and more devoted their activity exclusively to medical practice. Because of its inefficiency at that time, medicine lost its prestige. In recent times, however, medicine is becoming an effective science; one marvelous discovery has followed another, and the efficiency of medical practice has been rapidly increasing. Medicine makes habitable to man hitherto uninhabitable parts of the world. It prevents disease; and, with increasing theoretical and practical efficiency, medicine is learning to alleviate and cure disease and injuries. Medical sciences and medical men have steadily risen in the esteem of civilized mankind. May not the medical sciences and medical men become again the standard bearers of morality, especially of international morals?

To accomplish these objects, it is proposed to organize as large and effective an association as may be possible, of men and women engaged in the medical sciences or in medical practice under the name of THE MEDICAL BROTHERHOOD FOR THE FURTHERANCE OF INTERNATIONAL MORALITY. It is obvious that such a brotherhood could not exercise an important influence at once. But our modest expectation for prompt results should not prevent us from attempting now to take the first step in the right direction. Many important results have often had small beginnings. A committee of physicians and medical investigators requests you herewith to enroll as a member, and to declare your willingness to endorse and support the moral standard which the medical profession generally upholds when called on to perform its patriotic duties in all international strife.

It should be expressly understood that it is not the object of the proposed brotherhood to influence the feelings and views of anyone regarding the problems involved in the present war. It is desired merely to bring to the full consciousness of the members of the medical profession the exceptional moral position which all civilized nations, even while at war, permit and expect medical men to occupy, at least as long as they remain in the medical profession and act in this capacity. This consciousness cannot fail to elevate the moral standards of physicians. Furthermore, after the close of the present war, the brotherhood could without doubt facilitate the reunion of the members of the medical profession of all the nations which are now at war and increase good feeling among them. A humanitarian body such as the proposed brotherhood, if already in existence and ready for service, might and could be of the greatest usefulness in many ways.

Executive committee, made up of residents of the city of New York—President: Dr. S. J. Meltzer, member, Rockefeller Institute; first vice president, Dr. Rufus Cole, director, Rockefeller Hospital; second vice president, Dr. S. Josephine Baker, director, Department of Child Hygiene; first secretary, Dr. William J. Gies, professor of biologic chemistry, Columbia University; second secretary, Dr. Harlow Brooks, professor of clinical medicine; treasurer, Dr. Robert T. Morris, professor of surgery, Post-Graduate Medical School.

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Physicians are requested to enroll as members. There is no membership fee. But voluntary contributions for the purpose of upholding the organization, distribution of literature, etc., will be gratefully accepted. Replies and contributions to be sent to the Medical Brotherhood, care of Dr. S. J. Meltzer, 13 West One Hundred and Twenty-First Street, New York.

Study of the Placental Blood

In the Board of Health laboratory of the Canal Zone (April Report), studies were made of the placental blood film in cases in which there was a possibility of estivo-autumnal malaria being associated with pregnancy and the puerperium. From these studies it was decided that the placental blood film made from the maternal surface of the placenta immediately after labor possesses important diagnostic value, because, from the third month on, the placenta becomes even a better medium for the location of this parasite than the peripheral blood; in many cases it will show the parasites when the latter will not. The parasites are more numerous and larger, and the phagocytosis of pigment is much more apparent. In the late stages of pregnancy it is said that the placenta in some of its vascular peculiarities corresponds more nearly to the appearance of the spleen and bone marrow, and therefore offers favorable features for the localization and development of parasites. The examination of films from the placenta will frequently aid in differentiating puerperal sepsis from malaria, and the test might be used as a routine in tropical obstetrics. The pregnant state seems to encourage outbreaks of latent malaria late in the pregnancy, and also predisposes the individual to primary infection when exposed to malaria. It is not believed that congenital malaria ever occurs without some associated accident of pregnancy, such as injury to the placenta.

Hospital Efficiency

The committee on hospital efficiency, appointed two years ago by the Philadelphia County Medical Society, has made several reports on the subject, which have been embodied in a pamphlet by the society. It is said that there are in the United States 6,665 institutions on record for the care of the sick, with a total capacity of 600,000 beds, representing an outlay of over $1,500,000,000 and a yearly expenditure for maintenance of over $250,000,000. It is stated that per-

haps 20 per cent. of this sum is wasted through lack of hospital efficiency, and that the waste of human labor and opportunity is incalculable. There is no standard of hospital efficiency, and the committee has undertaken to formulate one. The committee also approves the request of the American Medical Association, the surgeons and the American Hospital Association that the Carnegie Foundation report on the classification and standardization of hospitals in a manner similar to the work done in the matter of medical education.

Illegitimacy in California

In a study of this question by Maude Lane Andersen, in the *Baby Hospital Bulletin*, it is noted that the death rate among illegitimate children is sometimes more than twice as high as among legitimate children. In a study of 163 cases, 25 per cent. of the mothers were the only children in the family, and the percentage of illegitimacy gradually decreased as the size of the family increased. This was regarded as testimony to the value of large families.

Medicolegal

Surgical Patient Jumping from Unguarded Window

(Breeze vs. St. Louis & S. F. Ry. Co. (Mo.), 147 S. W. R. 409)

The Supreme Court of Missouri, Division No. 1, holds that the defendant was not liable for the death of an employee who, while in its hospital after a surgical operation had been performed on him for appendicitis, jumped from an unguarded window of his room on the second floor. The court says that there was no evidence introduced tending to show that the patient was possessed of suicidal mania, or mania of any kind, for that matter; at most it was that he was insane at intervals, but with no indication whatever, prior to the fatal leap, that he intended to do himself or any one else any personal harm. In the absence of such a showing, there was no evidence tending to show that the defendant had any reason to anticipate that the patient contemplated self-destruction. In other words, his act, in leaping from the window, in the absence of suicidal mania, was not the ordinary or usual conduct that the defendant, as an ordinarily prudent person, should have anticipated he would have done under the circumstances. It is not every man that is temporarily unbalanced from the effects of a surgical operation that possesses suicidal mania, and in fact there are but few cases of that character, as common observation and experience teach us; and, in the absence of evidence tending to show such bent of mind on the part of the patient, the court would not have been justified in submitting that question to the jury, for no one, as previously stated, would have anticipated such conduct on his part.

Power of Board of Medical Examiners to Employ Counsel

(State ex rel. State Board of Medical Examiners et al. vs. Clausen, State Auditor (Wash.), 146 Pac. R. 630)

The Supreme Court of Washington denies the application made for a writ of mandamus directing the state auditor to issue a warrant for $200 in favor of an alleged regularly retained and employed attorney and legal adviser of the board, the auditor having refused to issue the warrant on the ground that the medical board was without power to hire or employ private counsel at the expense of the state. It was alleged that it was impossible for the board properly to discharge the duties imposed on it by the statute creating it without the aid of legal counsel whom it could at all times consult and who was conversant with the work of the board and the legal questions constantly arising out of such work, and that it had been the custom and practice of the board, since its creation by the statute of 1909, to employ and pay private counsel, as well as the practice of medical boards acting under like and similar statutes existing prior to the enactment of the statute creating the present board. The court says that it cannot think material the allegations of the petition concerning the inability, neglect and refusal of the attorney general and the various prosecuting attorneys of the state to attend on and advise the board, and to prosecute violators of the provisions of the medical act. They were inserted in the petition, no doubt, to show the necessity for the employment of private counsel. But there is no express provision in the act creating the medical board empowering it to employ private counsel. Conceding that the board may find it necessary, in the performance of its imposed duties, to have advice and assistance, and is obligated by law to seek such advice and assistance, from the attorney general of the state, or from some one of the various prosecuting attorneys of the state, it cannot, merely because these officers are unable, or because they neglect or refuse to furnish it with such advice and assistance, employ private counsel for that purpose. The term "necessity" in such cases means "legal necessity" as distinguished from "actual necessity." In other words, if a person or board is charged by law with a specific duty, and the means by which the duty is to be accomplished are not specially provided for, the person or board so charged has the implied power to use such means as are reasonably necessary to the successful performance of the required duty, which in the present case might include the power to employ private counsel. But where a person or board is charged by law with a specific duty and the means for its performance are appointed by law, there is no room for implied powers, and the means appointed must be followed, however inadequate may be the result. So, here, if the law has made the attorney general and the several prosecuting attorneys of the state the legal representatives of the board of medical examiners, these are the only persons who can lawfully be paid for the work, no matter how indifferently they perform their duties. On the other hand, if these officers have not been constituted by law the legal representatives of the board, then the board may hire and pay with state funds such assistants, in the way of legal counsel, as it may find reasonably necessary to the performance of its duties; but this is not the case here.

Law Sufficient as to Chiropractors

(Loche vs. Ionia Circuit Judge (Mich.), 151 N. W. R. 623)

The Supreme Court of Michigan grants a writ of mandamus requiring the circuit judge to set aside an order quashing an information filed charging one D. J. Healey with having wilfully and illegally engaged in the practice of medicine in violation of Act No. 237 of the Public Acts of 1899 and acts amendatory thereto. The court says that the issue before it was the validity of this information. It turned on the two questions of whether that with which the accused was charged could, in common acceptation and as generally construed by the courts, be regarded as engaging in the "practice of medicine," and whether the title of the act was sufficiently broad to include the same. If so, the information was good under the original act, irrespective of the amendment. The title of the original act is: "An act to provide for the examination, regulation, licensing and registration of physicians and surgeons, and for the punishment of offenders against this act, and to repeal acts and parts of acts in conflict therewith." The court is unable to discern any material difference in scope and meaning between this title and the titles of similar laws in other states passed "to regulate the practice of medicine" dealing with the various activities of those who, assuming special skill and knowledge in the treatment of disease, engage in such work for profit, and which, under such titles, provide for their examination as to qualifications, registration and license to practice, with resulting punishment for those offending against such provision. It needs no citation of authority to sustain the proposition that practicing medicine, surgery and the healing art generally or professing to heal the afflicted in any manner by any means as a vocation for hire are related subjects, ostensibly to the same end, naturally affecting one way or the other, and germane

to the public health. The comparatively early case of *People vs. Phippin*, 70 Mich. 6, plainly aligned this state with those refusing to restrict the practice of medicine to the administration of drugs or use of surgical instruments, and, although then rendered less binding as a controlling precedent by a division of the court, it has not since been questioned, but, on the contrary, both cited with approval by this court and strengthened as an authority by abundant and carefully reasoned decisions in other jurisdictions. As before suggested, the validity of this information was not contingent on the legality of provisions relative to licensing in the amended act. That it is within the police power of the state and the scope of the title to so provide, or not, in the discretion of the legislature, the court is well satisfied. Neither can the court concern itself with whether "the system of treatment practiced by chiropractors is a separate, systematic, coordinated, and arranged branch . . . which has firmly established its worth," or merely of the class of alleged methods of treatment without proved merit, often skilfully heralded with extravagant assurances and new-coined names as a thing inspired for the healing of the nations, to which the sick and afflicted searching a cure in their extremity are prone to harken with credulity. It may be all the accused claimed for it, but it is a calling directed to the serious business of treating human ailments for the purpose of restoring the sick to health, and directly related to the public health, to protect which is peculiarly within the police power of the state.

Society Proceedings

THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

Meeting Held May 5, 1915

The President, DR. JAMES C. WILSON, in the Chair

Cardiovascular Poisons; Their Methods and Results

DR. ROBERT N. WILLSON: To those who know the heart simply as a muscular pump, the function of which is to supply the various parts of the body with blood, the term "cardiovascular poison" will mean little more than a drug which causes the heart to misbehave or to functionate badly. It is no very recent discovery that if any human organ is overrich in its nerve supply, the heart is that one. It is an exceedingly important item of knowledge that one of the main nervous distributions in the heart is subendocardial. Highly important also is an appreciation of the probability that the cardiac nervous structures enter in greater or less degree into the inception and the discharge of each and all of the main functions of the heart. Of three groups of cardiovascular poisons, the first is decomposition of food products. These I believe constitute the causal factor in arterial changes and the hypertension contributing so actively to the cardiac disease of later years. A second class of cardiovascular poisons consists of micro-organismal influences which make their attack from without. The infectious diseases approach without adequate warning, and the harm is accomplished before the danger is realized. Syphilis, tuberculosis, rheumatism, so-called, and diphtheria illustrate fairly well the various forms of micro-organismal invasion of the heart and vessels. Syphilis and tuberculosis begin with heredity, and very frequently we find the children of luetic or tuberculous parentage the subjects of myocardial or valvular defects. The tubercle bacillus and its toxin also furnish us with an invariably diseased heart. Regarding the acute rheumatic infection, we are in an uncertain and a transition stage with respect even to its etiology. In diphtheria we experience nearly 100 per cent. of instances of myocardial involvement.

The third class of cardiovascular poisons is that of tobacco and alcohol. It is my belief that between tobacco and the various forms of food toxemia can be divided the responsibility for the vast amount of arteriosclerosis not attributable to syphilis and old age. From the evidence at hand, it seems fair to conclude that degenerative processes are at work in every tobacco-poisoned heart. Alcohol is almost the twin of tobacco in its anesthetic and narcotic effect. We need not discuss its lack of claim to a food value. This lack has been demonstrated beyond all peradventure and accepted as a working principle in all of the foremost laboratories. We know that in small doses and in large, alcohol in continued use soon depresses and then paralyzes the vasomotor nerves. While we do not know that alcohol produces arteriosclerosis, we know that tobacco does, and that the use of alcohol practically implies the craving for tobacco. Other excesses in food and venery are closely associated with alcoholism and the tobacco habit that tend equally toward sclerotic vessels and myocardial disease. It is impossible, therefore, either to indict alcohol on the score of directly producing arteriosclerosis, or to relieve it completely of either a direct contributory or indirect responsibility for much of the rapidly increasing cardiovascular disease. It is only fair to exonerate the drug alcohol from contribution to the sclerotic total when used by the physician in therapeutic dosage, if there be any such thing. There is an abundance of reliable evidence to show that the administration of alcohol lowers the vital resistance to bacterial infections by diminishing the power of the human economy to marshal its phagocytes at will and to manufacture the antitoxins requisite to combat the infections which work mainly as toxemias. The only conceivable occasion on which the drug could assist in a grave toxemia would be in such an infection as typhoid fever, occurring in a strong, robust individual of high antitoxic resisting power, in whom there was a too wholesale destruction of bacteria in the tissues with danger that the patient may poison himself to death through the very process that usually works the cure. In the vast majority of typhoid patients, however, this danger is not present. There are few physicians approximating above or below 40 years of age who feel that a place remains for alcohol in the pharmacopeia of the well-read and conscientious physician, except as an emergency stimulant, and then only in minimal dosage, which does not mean a half ounce or an ounce at intervals of a few hours. The physiologic effect of alcohol is better comprehended by the lay public today than by the average medical man, judging by the tide sweeping over the country.

DISCUSSION

DR. H. A. HARE: The first mistake in Dr. Willson's paper is that of making sweeping statements without the slightest justification for many of them, and some of them in direct controversion to known laws of physiology and pathology. To state, for example, that in the early stage of the influence of alcohol this drug stimulates the circulation by stimulating the vagus is to show an entire ignorance of what every second-year student in medicine knows: that the function of the vagus is inhibitory and that in its action it decreases functional activity of the heart rather than increases it. When the statement is made that alcohol produces arteriosclerosis and arterial spasm, and in the same breath the assertion is made absolutely that alcohol depresses the entire vasomotor apparatus, it is difficult to agree, for it is not easy to see how a drug can produce a rise of blood pressure at the same time that it is producing a lowering of blood pressure by depressing the vascular system in general. Dr. Willson does not seem to be familiar with what physiologists and pharmacologists recognize as the true physiologic action of alcohol. So far as the circulatory action of alcohol is concerned, in moderate amounts it does not act as a stimulant or as a depressant, but it equalizes the circulation. There is no drug that has physiologic power which, if wrongly used, will not also have the power to do harm. In a recent meeting of the County Medical Society a gentleman who read one of the papers said that alcohol was always contraindicated in tuberculosis. While such a statement is too sweeping to bear weight, published under certain circumstances it might do harm. While the harmfulness of alcohol in miliary tuberculosis is well known, in fibroid phthisis with cough inter-

fering with digestion, the administration of alcohol is the administration of food which is burnt up in the body, which lends energy to that body which stimulates digestion, and which, if given in the proper form, may even help him to expectorate the material which is in the cavities. What is needed, I take it, is the presentation of a paper which recognizes that when alcohol is abused it does harm; when used rightly, it has a definite, specific and often a very valuable place in medicine. This is true in diabetes mellitus, in which, in certain cases, alcohol burnt up in the body possesses a distinct food value. Dr. Willson made the dogmatic statement that *all*—I think he said *all*—researches show that alcohol decreases the ability of the blood to combat infection. I will be equally dogmatic and say they do not do anything of the kind. On the contrary, there are researches which show that alcohol increases the ability of the body to protect itself in certain instances. Some time ago I presented the results of a research to the effect that in typhoid fever and tuberculosis alcohol in proper doses increases very materially the bacteriolytic action of the blood. The technic by which the studies were made was according to directions given by Dr. Simon Flexner. On one point Dr. Willson and I agree, that the crusade in the profession which has been waged against alcohol has diminished the size of the dose which many physicians now give.

DR. H. C. WOOD: There are several loose expressions in Dr. Willson's paper which I do not think should be allowed to go uncorrected. He speaks of the "cardiovascular action" of drugs. It is well known that a drug may have one action on the heart and an opposite action on the blood pressure. Because a drug lowers blood pressure is no proof that it depresses the heart, and vice versa. Pharmacologists always separate these two actions and study the effect of the drug on the heart as distinct from its effect on the blood vessels. If he had made this distinction he would probably not have fallen into the error of comparing alcohol to nicotin in its physiologic action. It is hard to imagine two drugs more widely different in physiologic effect than alcohol and nicotin. Dr. Willson, in drawing his conclusions from the experiments quoted, fails to make sharp the distinction between the therapeutic and the toxic dose of alcohol. He speaks of the secondary results of alcohol as if the depressant effect followed when therapeutic quantities were given; whereas, I understand that the depressant results are the effect of toxic doses. Dr. Willson quotes the experiments of Dr. Dixon, but neglects to say that Dixon reached the conclusion that alcohol acted as a foodstuff for the heart. It is a long time since I read Kochmann's paper, which he has also quoted, but the impression made on my mind at that time was that he regarded alcohol in proper dosage as a stimulant to the heart muscle. I do not think there is any reliable scientific evidence that the secondary effect of small doses is a depressant action on the heart muscle.

DR. ROBERT N. WILLSON: Dr. Hare ventured the assertion that I was guilty of ignorance of the first principles of cardiac physiology on the basis of my having made a statement (as claimed by him) that alcohol or any other drug stimulates the heart by stimulating the vagus nerve. What I actually did say was that alcohol causes a stimulation of the cardiac action through its depressant action on the vagus nerve. Dr. Hare by his remark would appear to lay himself open to the suspicion of possible ignorance with respect to the action of the sympathetic nerve when the controlling influence of the vagus is set aside. Again, I made no such statement as that alcohol produces arteriosclerosis. Indeed, I made absolutely the opposite statement, namely, that there exists no final evidence that alcohol does produce arteriosclerosis. I did show that the combination of tobacco with alcohol often results in the production of arteriosclerosis. I also took pains to refer to the fact that the combined action of the two drugs gives a different result from that of alcohol alone. Dr. Hare claims that the difference between the action of alcohol and tobacco lies in the fact that tobacco raises the diastolic, and lowers the systolic blood pressure, whereas alcohol lowers both in its secondary action. Dr. Hare is correct in his belief that the dominant action of alcohol is vasodilator after its first temporary splanchnic-constrictor influence, but he forgets the important fact that vasodilation also characterizes tobacco after its early vasoconstrictor action, and becomes its permanent influence. The evidence obtained from the action of both of these drugs is to the effect that vasoconstriction and the elevation of blood pressure are not indispensable to the production of arterial disease. I was sorry to hear Dr. Hare revert to the fallacy that alcohol is a food in any true sense of the word. Dr. A. E. Taylor showed in a most conclusive manner that alcohol is never a food in the true sense, and that to call it such shows an entire ignorance of the readily available laboratory findings. Dr. Taylor's statement represents the consensus of intelligent medical opinion on the subject.

AMERICAN ASSOCIATION OF IMMUNOLOGISTS

Second Annual Meeting, held at Washington, D. C., May 10, 1915

(Concluded from page 358)

The Virulence of Various Strains of Human Tubercle Bacilli

DR. GEORGE BURTON GILBERT and DR. HAROLD GREGG, Colorado Springs: The use of living bacilli for the production of immunity has been of little avail because of our inability to control the exact number and the virulence of the bacilli. Using the ingenious device of Prof. M. S. Barber for the isolation and inoculation of any given number of living virulent tubercle bacilli, it has been possible to show great variation in the minimum lethal dose of different virulent cultures. In an effort to obtain a culture of moderate virulence for future work along immunologic lines, we decided to obtain a large series of cultures of tubercle bacilli from different types of cases and from different organs of the body, and then to study these in detail as to virulence. The cultures were obtained, using the mediums advocated by Petroff, consisting of 1:1,000 gentian violet, two parts of whole egg, and one part meat juice. Definite numbers taken from the fresh cultures less than one month old were inoculated subcutaneously in the nipple area of guinea-pigs. Both local and internal lesions were studied. Owing to the lack of guinea-pigs, only six cultures can be reported on at the present time. The results show the absence of both local lesions and local regional glands in seven instances in which macroscopic disease was found in one or more internal organs. This was quite unusual in our experience. It is safe to assert that great difference in virulence occurs in virulent cultures obtained from various cases. Whether or not cultures obtained from various organs differ regularly remains to be determined.

An Analysis of Laboratory Methods Used in the Examination of Cerebrospinal Fluids

DR. RICHARD DEXTER and DR. CLYDE L. CUMMER, Cleveland: We have examined a number of spinal fluids by means of the Wassermann reaction, cell count, globulin content and, more recently, by the Lange colloidal gold reaction. The number of fluids examined was considerable, embracing 177 from cases of indubitable lues of the central nervous system and 132 spinal fluids in which lues was either nonexistent or nonactive. It may be said that the use of amounts of spinal fluid up to ten times the amount of the Wassermann test dose will increase the number of positive Wassermann reactions in syphilitic disease of the nervous system. The use of such large amounts of spinal fluid does not tend to nonspecific binding in nonluetic cases. The use of double our maximum dose in the control tube rarely tended to anticomplementary action. The Lange colloidal gold reaction in the spinal fluid would seem to be present in cases of syphilitic involvement of the central nervous system more frequently than a positive Wassermann reaction, an increased cell count or an increased globulin content. The colloidal gold test was

constant in paresis, and the "typical curve" was also very constant. While strong reactions occur in tabes and cerebrospinal syphilis, we have rarely seen the "typical curves" described for these conditions.

DISCUSSION

DR. W. EGBERT ROBERTSON, Philadelphia: I have reached the same conclusions with respect to the amounts of spinal fluid to be used in making the Wassermann test. For two years I have used as a routine three tubes containing 0.5 c.c. and 1.5 c.c., respectively. Occasionally only the largest amount will yield a positive result. In paresis, however, it is the rule to find all three tubes positive. In every instance I not only made a Wassermann on the spinal fluid, but also counted the cells, and did a Nonne, Noguchi, Fehling's and gold solution test. Dr. Paul Weston of the Warren State Hospital, Pennsylvania, made a very large number of counts and found that they varied day by day and without any apparent reason. In all instances, counts were made within a few minutes of taking the spinal fluid, so that no opportunity for cytolysis was given. In my experience there was always a direct relationship between the degree of pleocytosis and the protein content of the spinal fluid. As to the gold solution, though the preparation of the solution is extremely difficult, the application of the test is very simple and the results of considerable value, not alone in suspected cases of syphilis, but also in disease of the brain and cord or their coverings, whether of a primary or secondary nature. For instance, in uremia one finds almost constantly that the first tube will go down completely, while the others remain unchanged, or but so slightly changed as to be of no special moment. In one instance with a negative Wassermann, both in the blood and spinal fluid, with a low cell count, an absent Nonne and Noguchi and reduced Fehling's, Tube 5 became water clear, while all the rest remained unchanged. In genuinely specific cases the gold reaction is a variable one; for instance, in advanced cases of paresis and tabes, all of the ten tubes which we employ in our series may become water clear. Speaking very generally, we have usually found that the curve of paresis is more apt to be irregular, the first two or three tubes being water clear, then two or three tubes of variable color, while perhaps six and seven may again be water clear with little or no change in the last two or three. In tabetics of the less advanced type, the earlier changes will be slight, while Tubes 4, 5 and 6 will often be water clear, and perhaps the rest of the series water clear. In one case of gumma of the brain, the first two tubes were slightly changed, while the remainder from the third to the tenth were all water clear. In one case of multiple sclerosis in which the spinal fluid was under considerable pressure, there was a negative Wassermann both in the blood serum and in the spinal fluid, with a slight increase in the cell count, with a positive Nonne and Noguchi, Fehling's reduced, and the gold solution showed no change in the first six tubes, slightly progressive change in the seventh and eighth, while the ninth and tenth were water clear. Our work has not been sufficiently extensive to enable us to draw definite conclusions on the value of the gold solution reaction, but we can state positively that the character of the curve varies materially with the improvement or retrogression of any particular case, and in two instances in which we had positive Wassermann reactions in cases of tabes, with marked gold solution reactions, when the patients improved clinically and the Wassermann reactions became negative, the gold solution likewise became negative.

DR. GEORGE P. SANBORN, Boston: We have made 200 observations. In paresis we have obtained from the analysis of the cerebrospinal fluid just what had been obtained at the Johns Hopkins Hospital in Baltimore in tabes. In tabes we have never obtained tubes that were absolutely decolorized. In the suspected cases which gave the clinical signs of tabes and those alone, the tubes were decolorized in the first three or four days; but in these cases the nerve infection was more extensive than the clinical diagnosis suggested. There might have been a paretic element in the case. We have also found that after the injection of the salvarsanized serum in a number of cases the intensity of the gold solution reaction diminished with successive treatments, in some instances from three to four days. I have never seen a case of tabes in which we could get any definite decolorization in one tube and the ordinary growth in the rest of the tubes.

DR. RICHARD DEXTER, Cleveland: It is well to continue the treatment with small doses of a definite titration.

The Blind Dental Abscess

DR. HENRY L. ULRICH, Minneapolis: Blind dental abscess is a rather loose term. Other terms, such as alveolar abscess, peridental or apical abscess, though not entirely satisfactory, are better. Apical abscesses are never found at the roots of vital teeth. The pathologic anatomy of these areas is not very well understood. At the University of Minnesota Hospital, in an effort to correlate oral sepsis with systemic lesions, a special inspection of mouths was made for pyorrhea, gingivitis, caries and, by means of the Roentgen ray, for apical abscesses. We were struck by the frequency of apical abscesses in these cases. Over 68 per cent. of all artificially devitalized teeth were found with apical abscesses and the total number of abscesses, including those found in pulpless teeth due to caries or death from accident or too proximal fillings, was 83 per cent. In the examination of 500 cases, 1,350 dead teeth were found, and of these 976 had root canal fillings. Of these, 159 cases with apical abscess had bacteriologic review, and of 107 cases from the university clinic, 100 showed the presence of *Streptococcus viridans*. Of fifty-two cases from my private clinic, fifty gave a *S. viridans* or a *S. hemolyticus;* occasionally *S. mucosa* was recovered. The *Staphylococcus aureus* or *albus* or the *Micrococcus catarrhalis* was also observed in conjunction with the streptococcus. The apical abscess is merely another evidence of a focus of streptococcal focal infection, just as the heart, the mucosa of the stomach, the articulations or the kidneys are evidence of secondary deposits. In other words, it is of hematogenous origin. The pathogenicity of these abscesses and their relation to other concurrent foci have had ample clinical verification. A recent analysis of seventy-six cases in which a streptococcus was isolated from apical pockets showed that thirty-eight cases belonged to the rheumatoid group, six cases to the cardiovascular group, three to the asthenic, four to the gastro-intestinal, and two to the genito-urinary. A subgroup of eight cases consisted of those in which the streptococcus focal infection was superimposed on syphilis, tuberculosis, primary anemia or vice versa. The striking feature of this analysis was the diversity of clinical manifestations for which streptococcal focal infection was responsible. The blind dental abscess has a very practical significance; it may be the only focus left and may hold the balance of power in the struggle of the body for complete sterilization. In every case of streptococcal infection its presence or absence must be determined. Such a focus will furnish material for the preparation of vaccines, and much trouble and disappointment from attempting cultures from glands and tonsils can thus be avoided. Of the more striking symptoms in these groups, we had manifestations of rheumatoid conditions in 51 per cent.; heart lesions, 47 per cent.; secondary anemia, 43 per cent.; tonsils, 40 per cent.; pyorrhea, 25 per cent.; kidneys (albuminuria and nephritis), 34 per cent.; caries, 15 per cent.

DISCUSSION

DR. GEORGE P. SANBORN, Boston: In cases of rheumatism or joint infections, we should find some local infection which is the cause of the trouble; eliminate that cause and good results will follow. There are many cases in which it is impossible from the clinical history to locate the infection; in such cases the use of the Roentgen ray is of great value in seeking for this local infection in the mouth.

DR. JOSEPH HEAD, Philadelphia: I recall a case in which the tonsils appeared to be all right; but they were removed.

The joint affection persisted. It then occurred to me that the Roentgen ray might reveal some foci of pus around the roots of the teeth which accounted for the symptoms, and it did.

DR. A. PARKER HITCHENS, Toledo, Ohio: I suffered from pyorrhea alveolaris, and once in a while there would occur an acute "blow up." I also had a severe tonsillitis which was treated with silver nitrate, sprays, etc. The interesting thing was that the tonsillitis always came along with the acute exacerbations of the pyorrhea. Since the pyorrhea has been cured by the extraction of certain teeth, there has not been any trouble with tonsillitis.

DR. GERALD B. WEBB, Colorado Springs: I wish to inquire if the use of the Roentgen ray would enable one to make a diagnosis of pus at the apical portion of the teeth.

DR. HENRY L. ULRICH, Minneapolis: We are still at sea regarding the value of the roentgenogram in this disease. As a matter of fact, after extracting teeth because of abscess formation, when we made sections we did not find necrosis, but the results of ordinary inflammatory conditions. Histologically, we have not worked out the study to our satisfaction. It is of particular interest that these abscesses are found so frequently, and I believe they must be secondary and not any primary foci of infection. With regard to the relief of the tonsillitis after the extraction of teeth, this is readily explained, I believe, by the vaccine theory.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Obstetrics and Diseases of Women and Children, York, Pa.

July, LXXII, No. 1, pp. 1-208

1 *Effect of Pubiotomy on Course of Subsequent Labors. J. W. Williams, Baltimore.
2 *Use of Galvanocautery Knife for Excision of Mammary Tumors for Microscopic Diagnosis. J. W. Bovée, Washington, D. C.
3 *Sweat-Gland Tumors of Vulva (Adenoma Hidradenoides Vulvae). G. W. Outerbridge, Philadelphia.
4 Case of Primary Syncytioma of Ovary. E. Ries, Chicago.
5 An Improved Ionization Method for Treatment of Carcinoma of Cervix. G. B. Massey, Philadelphia.
6 Uses of Desiccation Surgery in Gynecology. W. L. Clark, Philadelphia.
7 Static Currents of Value in Gynecology. A. B. Hirsh, Philadelphia.
8 Roentgenotherapy in Uterine Fibroids and Uterine Hemorrhage. G. E. Pfahler, Philadelphia.
9 Radium in Gynecologic Practice. W. B. Chase, Brooklyn.
10 Treatment of Advanced Carcinoma of Cervix with Radium. B. M. Anspach, Philadelphia.
11 *Study of Specificity of Ferments in Pregnancy and Mechanism of Abderhalden Reaction. Serum Studies in Pregnancy. J. A. Kolmer and P. F. Williams, Philadelphia.
12 Statistical Study of Frequency of Funnel Pelves and Description of New Outlet Pelvimeter. H. K. Thoms, New Haven, Conn.
13 *Etherometer, Means for Mechanical Anesthesia. F. Montgomery, New York.
14 Heart Disease in Childhood. H. E. Tuley, Louisville, Ky.

1. **Effect of Pubiotomy on Course of Labors.**—Williams' article is based on the study of thirty labors, which occurred subsequent to pubiotomy in twenty individuals. Thirteen full-term and three premature children were born spontaneously. In somewhat more than one third of the cases, particulary in funnel pelves, pubiotomy has resulted in sufficient enlargement of the pelvis to permit subsequent spontaneous labor. Williams' experience has taught him greater conservatism in the employment of pubiotomy which, he says, should not be regarded as an elective operation, except in funnel pelves in young women. In contractions of the superior strait, the ideal should be to differentiate the patients into those requiring cesarean section at the onset of labor, and those in whom a spontaneous outcome may reasonably be expected. Pubiotomy should be employed in the latter only when failure of the head to engage after a prolonged second stage has demonstrated that the prognosis was erroneous.

Pubiotomy does not compete with elective cesarean section at the onset of labor, but is far safer than conservative cesarean section late in the second stage. In moderate degrees of contraction of the pelvic inlet, the great field for pubiotomy is in patients who have not been seen until late in labor, or who have been examined by those whose technic is questionable. In such circumstances, conservative cesarean section is too dangerous, so that the choice lies between pubiotomy, cesarean section followed by removal of the uterus, or craniotomy on the living child. If definite infection is present, pubiotomy is contraindicated. In version or breech extraction when there is moderate disproportion, prophylactic laying of the Gigli saw adds greatly to the peace of mind of the operator, as it enables him to resort promptly to pubiotomy if unexpected difficulty is encountered. The most promising field for pubiotomy is in funnel pelves in young women, as it not only permits the delivery of a living child, but offers a reasonable prospect of permanently enlarging the pelvis, so that subsequent labors will end spontaneously. With proper training in the treatment of labor complicated by contracted pelvis, Williams believes that the induction of premature labor can be abandoned definitely.

2. Abstracted in THE JOURNAL, June 19, 1915, p. 2092.

3. **Sweat-Gland Tumors of Vulva.**—Of recent years there has come to be recognized a fairly definite group of tumors of the vulva, usually involving the labia majora, and believed to originate from sweat glands. The tumors are small, rarely exceeding a centimeter in diameter, slow-growing, painless and present few clinical symptoms. They may be single or multiple, unilateral or bilateral. On microscopic examination, they present a papillary cystadenomatous structure, in which certain characteristics of the finer anatomy of normal sweat glands are reproduced. Both histologically and clinically, the tumors of this class so far reported appear to have been for the most part benign, although the possibility of recurrence after removal, or of carcinomatous degeneration, must not be lost sight of. Outerbridge reviews the literature and reports one personal case.

11. **Serum Studies in Pregnancy.**—Kolmer and Williams summarize their work as follows: Proteotoxins are produced during the Abderhalden pregnancy reaction which, when injected intracutaneously and intravenously into normal animals produces local and general changes analogous to anaphylactin reactions. Proteotoxins produced in a mixture of human pregnancy serum and human placenta are toxic for normal guinea-pigs. The ninhydrin test with dialysates and intracutaneous and intravenous injections of the serum in the Abderhalden reactions yielded fairly parallel indices of the degree of protein digestion and proteotoxin production. The addition of various tissue substrates other than placenta, to human pregnancy serum, was followed occasionally by proteotoxin production as shown by intracutaneous and intravenous tests with the serum, but except when a substrate of human kidney was used the amount of proteotoxin produced was usually much less than that produced in mixtures of pregnancy serum and human placenta. Similar results were observed with inorganic adsorbents, as kaolin, starch quartz, etc.

The proteolytic ferments in healthy normal serum may produce small amounts of proteotoxins when tissue substrates are added and occasionally and to less degree with inorganic absorbents as kaolin and starch.

Complement in itself has no direct relation to the ferments in pregnancy serum. Inactivation of serum probably reduces its digestive power through destruction of a normal proteolytic ferment, and reactivation of a serum by means of the addition of serum complement increases its digestive power to a slight degree, probably by reason of the addition of these normal ferments. In pregnancy serum there are two sets of proteolytic ferments, normal and nonspecific and specific ferments. The former may be released through absorption of the antiferment by means of various nonspecific organic and inorganic substances, whereas the latter are released through the absorption of the antiferments by means of the specific protein antigen alone. Kolmer and Williams' experi-

ments also suggest that the protein matrix in the Abderhalden reaction is not only the protein of the serum but also to some extent that of the tissue substratum itself.

13. **Etherometer, Means for Mechanical Anesthesia.**—The device used by Montgomery consists of an air-tight graduated glass container having a cap arranged with two valves. One valve is an inlet valve for air, similar to the valve in an automobile or bicycle tire which permits air to enter but has a shut-off to prevent its escape. The other valve is an outlet valve to control the flow of anesthetic forced out under the air pressure. This valve is so adjusted that the number of drops per minute discharged from the container may be very accurately controlled. The air pressure necessary to operate the device is obtained by means of a small rubber hand bulb similar to an atomizer bulb. This bulb is only used to charge the apparatus after which it is removed just as in the case of a bicycle-tire pump, after the tire is inflated. When the etherometer is filled with the anesthetic and charged with air in this way it is ready for use and will operate automatically until it is emptied. The anesthetic is discharged through a long flexible tube to the face mask where it is diffused on the gauze by means of multiperforated tubes arranged in the mask. All the anesthetist has to do is to place the mask on the patient's face and turn the valve so that the requisite number of drops per minute are flowing to the mask. The rate of flow is observed through the glass sight-feed on the cap.

American Journal of Tropical Diseases and Preventive Medicine, New Orleans

June, II, No. 12, pp. 735-782

15 Mosquito Eradication and Prevention. W. D. Wrightson, New Orleans.
16 Anopheles Production from Malarial Survey. H. R. Carter, U. S. P. H. Service.
17 Experiment with Stomoxys Calcitrans in Attempt to Transmit Filaria of Horses in Philippines. M. B. Mitzmain, U. S. P. H. Service.
18 *Intravenous Mercuric Chlorid in Malaria. N. Barlow, Cuyamel, Honduras.
19 Point to be Considered in Utilizing Duck as Mosquito Destroyer. F. C. Bishopp, Dallas, Tex.

18. Intravenous Mercuric Chlorid Malaria.—Barlow cites the case of a native who had suffered for nine days with typical malarial paroxysms occurring every other day. The blood showed a very heavy tertian infection, with but one brood of plasmodiae. An intravenous injection of slightly less than one-forth grain of mercuric chlorid was given at 10 a. m., the chill being due the same day at 4 p. m., the parasites varying from three-quarters grown to nearly developed schizonts, with numerous gametes. The paroxysm did not appear, but was replaced by a gentle fever beginning without a chill at 2 p. m., gradually rising to 101.6 at 5 p m., and subsiding by lysis. With the exception of a single 5-grain capsule of quinin, taken previously and which had produced no appreciable effect either on the fever or on the blood picture, the patient had no other medication, either before or after the injection. There were no further symptoms of malaria.

Six weeks later, a series of blood specimens were taken at frequent intervals. There were no parasites found and the differential leukocyte count was normal. The action on the parasites was very interesting, and in marked contrast to that observed by the author after the administration of quinin by the intravenous route. The ameboid motion in fresh specimens was retarded by mercury, but was more active after quinin. The rate of growth, judged by comparison of successive stains, was made more slow or checked altogether by mercury, but was accelerated by quinin. Of the nearly developed schizonts, only a few proceeded to full development after mercury, while all did so after quinin. The entrance of the merozoites into the red cells was unaffected by the presence in the blood of 20 grains of quinin; no evidence of its occurrence was seen after mercury. The action of quinin was evident only on the partly grown schizonts. Mercury was destructive to all forms. The gametes were not promptly affected by either; but entirely disappeared thirty hours after the mercury, while their complete disappearance after quinin occurred only after several days.

Annals of Surgery, Philadelphia

July, LXII, No. 1, pp. 1-128

20 Notes on Military Surgery. G. W. Crile, Cleveland.
21 *Sarcoma of Breast. S. H. Geist and A. O. Wilensky, New York.
22 Carcinoma of Stomach. G. Woolsey, New York.
23 Leather Bottle Stomach. M. F. Porter, Fort Wayne, Ind.
24 *Cancer of Testis. W. B. Coley, New York.
25 Perienteritis Membranosa. A. G. Gerster, New York.
26 Bone Graft Peg in Treatment of Fractures of Neck of Femur. F. H. Albee, New York.

21. Sarcoma of Breast.—Of 558 cases of breast tumor, including chronic inflammatory growths, both simple and specific, analyzed by Geist and Wilensky, 22, or 3.9 per cent., were sarcomas of various types; 260, or 46.5 per cent., were carcinomas. Of the malignant tumors 7.7 per cent. were sarcomas. According to their histologic types, the 22 sarcomas are grouped as follows: fibromyxosarcoma, 5; spindle-cell sarcoma, 5; round-cell sarcoma, 4; cystosarcoma phylloides, 4; giant-cell sarcoma, 2; and perithelioma, 2. The tumors occurred in women between the ages of 29 and 49. All the women were married, and the majority had borne children. In two cases, one a fibromyxosarcoma, and the other a cystosarcoma phylloides, a history of trauma was obtained. In three other cases there was a history of a previous inflammatory condition. In two of these instances, both of them cystosarcomas, there was a history of mastitis, one eight years and one four years previously. In the third case, a perithelioma, a breast abscess had occurred twenty-seven years previously, on the same side. In three instances there was a history of a previous breast tumor; in two of these the tumors were in the opposite breast. In 57 per cent. of the patients the right breast was involved, in 33 per cent. the tumors were bilateral, and in 10 per cent. the tumor grew in the left breast. In one third of the cases, the skin was fixed to the tumor. Pain existed as a prominent symptom in one third of the cases.

Of the 22 cases, 11 patients were subjected to the radical Halstead operation; one patient had an amputation of the breast and dissection of the axilla; in one, a simple breast amputation was done; in five the tumor itself was excised; in one only a specimen was removed, and in the remaining three cases the type of operation was not described. With the exception of one patient, who died shortly after the operation, all the patients left the hospital in good condition. In three cases there were local recurrences after the tumors had been excised; in one case, three weeks; in the second, one month, and in the third, six months after operation. Of the 18 operated cases, 11 were traced. All of the patients but one are alive, the time since operation ranging from four months to nine years. Among them were five fibrosarcomas, on two of which radical Halstead operations had been performed. The other three were excised locally. One patient with round-cell sarcoma died of shock following a Halstead operation; a second patient, after bilateral local excision, returned in six months with recurrence. In two cases of peritheliomas, for which the radical Halstead operation was done two and nine years ago, respectively, the patients are alive and well now.

24. Cancer of Testis.—During the past twenty-five years, Coley has personally observed 65 cases of sarcoma of the testicle. In 52 cases the disease occurred in the normally descended testicle and in 12 cases, in the undescended testicle. Coley believes that his own series of cases show that cancer of the testis treated by simple orchidectomy, without any appreciable risk, and followed by a thorough course of treatment with mixed toxins of erysipelas and *Bacillus prodigiosus* (also without risk), have a far better prognosis than those subjected to the very extensive laparotomy with removal of the lumbar glands, as advocated by Chevassu and Hinman. In the majority of cases the disease was far advanced at the time when the patients came under observation. In only 9 the toxins were given immediately after primary operation before recurrence had taken place, and yet in spite of this,

13 patients were well beyond a period of 3 years, and only 2 of these recovered without the use of the toxins; furthermore, both cases were of the teratoma type, one almost a pure teratoma and probably not malignant; the other a teratoma with carcinomatous degeneration. Two of the cases of this series were cancer of the undescended testis. In one case the toxins were used after operation and the patient remained well over three years, when he died either of metastases or tuberculosis, probably metastases. In the other, the toxins were used as a prophylactic after operation; the patient is now well, eight years after.

Archives of Internal Medicine, Chicago

July, XVI, No. 1, pp. 1-148

27 *Digitalis Dosage. C. Eggleston, New York.
28 *Diagnostic Value of Uric Acid Determinations in Blood. O. Folin and W. Denis, Boston.
29 Case of Open Ductus Arteriosus (Botalli), with Necropsy. J. L. Stoddard, Boston.
30 *Clinical Actions of Veratrum. R. J. Collins, Cleveland.
31 *Relation of Calcium to Delayed Coagulation of Blood in Obstructive Jaundice. R. I. Lee and B. Vincent, Boston.
32 *Complement Fixation in Pertussis. M. Olmstead and P. Luttinger, New York.
33 Three Cases Showing Changes in Location of Cardiac Pacemaker Associated with Respiration. F. N. Wilson, Ann Arbor, Mich.
34 *Symptoms of Urinod Poisoning. F. A. Hartman, Boston.
35 Study of Several Factors of Acid Excretion in Nephritis. W. W. Palmer, Boston, and L. J. Henderson, Cambridge, Mass.
36 *Studies on Pathologic Physiology of Heart. C. J. Wiggers, New York.

27. **Digitalis Dosage.**—The cat method of standardization of digitalis, Eggleston found, yields results on which the dose for man can be based. The average therapeutic dose of digitalis, given orally to man in the form of the tincture or infusion, is 0.146 cat unit or about 0.146 c.c. of an average high-grade tincture per pound of body weight, as established by thirty-three observations. Fifteen observations have established 0.066 cat unit, or 0.023 mg., per pound as the average therapeutic dose of crystalline digitoxin. In approximately half of a total of 48 courses of administration of either digitalis or digitoxin, full therapeutic effects were secured with doses falling within 15 per cent. above or below the average dose. Doses considerably larger than the average were taken in 17 instances without the production of more than mild toxic symptoms. The activity of the preparation of digitalis has no material influence on the dose required in terms of cat units. Age, sex and cardiac condition do not seem to influence the size of the dose required. Both digitalis and digitoxin are probably rapidly and fairly uniformly absorbed from the alimentary canal of man, but digitalis is less completely absorbed than is digitoxin. Strophanthus, the strophanthins, ouabain, true digitalin, and some other digitalis substances are poorly or irregularly absorbed when given by mouth to man or to the higher animals and are unsuited for therapeutic use in this way.

28. **Uric Acid Determinations in Blood.**—In making use of blood analysis to decide whether a given doubtful case of joint disease is gout or arthritis, Folin and Denis state that it is absolutely necessary to determine the nonprotein nitrogen (or at least the urea) in the blood as well as the uric acid. And before the blood is drawn for such analyses it is indispensable that the patient should have been on a purin-free diet for at least two days. The level of the protein metabolism should also be ascertained by means of a nitrogen determination in the twenty-four-hour urine passed during the last day of the experiment. In gout the blood is almost invariably abnormally high in uric acid, while the other waste products represented in the nonprotein nitrogen of the blood are usually within the normal limits. In arthritis also the blood is not infrequently abnormally high in uric acid, but most such cases have abnormally high nonprotein nitrogen as well. Neither qualitative tests for uric acid in the blood nor quantitative determinations of the uric acid alone can be depended on in the differential diagnosis of gout and other joint diseases. For a differential diagnosis in doubtful cases of gout or arthritis by means of blood analyses the patient must be put on a purin-free diet and uric acid determinations must be accompanied by determinations of the nonprotein nitrogen (or urea).

30. **Clinical Actions of Veratrum.**—The preparation used by Collins was the 10 per cent. tincture from *Veratrum album*. Each dose was given in seven cases with from one to three glasses of water. By mistake one patient received only an equivalent of one-fourth glass and complained that each dose caused considerable gastric irritation, of which none of the others complained. All patients noted a fulness and throbbing in the head when the pulse rate reached its minimum. The therapeutically effective dose of the tincture of *Veratrum album* for adults ranged from 30 to 75 minims. Clinically, the effects of veratrum resemble the pharmacologic effects, and consist of a slowing of the pulse rate amounting to 12 to 42 beats per minute, and a fall of systolic blood pressure amounting to about 39; of the diastolic, 32 mm. The two hypertonus cases showed a fall of systolic blood pressure amounting to about 49 mm.; of the diastolic about 8 mm. The circulatory effects produced by veratrum take place independently of the "toxic" symptoms, such as nausea and vomiting.

31. **Relation of Calcium to Delayed Coagulation of Blood.**—The results of the studies made by Lee and Vincent would tend to show further that while the effect of bile in delaying coagulation is largely counteracted by calcium, yet bile has in addition an inhibitory effect on the formation of thrombin and on the action of thrombin already formed. Moreover, bile in very strong concentration in vitro entirely prevents coagulation even in the presence of an excess of calcium. It is doubted, however, if in obstructive jaundice such concentration of bile ever occurs as will entirely prevent coagulation of blood. Clinically this need of calcium can be met by the administration of any calcium salt. The authors have mainly used calcium lactate in the dosage of 100 grains a day. It must be administered over a period of several days before any marked effect on the coagulation time is seen. The necessity of employing large doses depends on the difficulty of securing the absorption of calcium from the gastrointestinal tract rather than the need of such large amounts of calcium.

32. **Complement Fixation in Pertussis.**—The most reliable antigen for complement fixation tests in whooping cough was obtained by Olmstead and Luttinger, by autolyzing an aqueous emulsion of a twenty-four to forty-eight-hour growth of the Bordet-Gengou bacillus for from eighteen to twenty-four hours at 56 C. and shaking for several hours. The closeness of relationship of the Bordet-Gengou strains is still under investigation. To obtain the maximum number of positive reactions it may be necessary to use a polyvalent antigen. Active serum may give nonspecific positive reactions. A negative reaction given by active serum is stronger evidence of the lack of an infection than is a negative reaction given by inactive serum. For fixation one-half hour in the water bath or one hour in the incubator is absolutely reliable. Icebox fixation probably gives reliable results; the optimum period is still to be determined. Fixation at room temperature for four hours is unsatisfactory, at least in rooms with variable temperature. About 40 per cent. of whooping-cough cases have given a positive reaction with antigens of the Bordet-Gengou bacillus, when inactive serum was used. The highest percentage of positives is given by convalescent vaccinated cases. Ten per cent. of whooping-cough cases have given a positive reaction with antigens of hemoglobinophilic strains. A ++, +++, or ++++ reaction by inactive serum with an antigen of the Bordet-Gengou bacillus is diagnostic of whooping cough, a + or ± reaction is suspicious, a negative reaction has little significance. Complement fixation tests on serum from 111 cases of pertussis or suspected pertussis support the theory that the Bordet-Gengou bacillus is the etiologic factor in the disease.

34. **Symptoms of Urinod Poisoning.**— Urinod is prepared from the distillates of acid-treated urines. It is a neutral malodorous oil boiling at 108 C. with 28 mm. pressure. It is a cyclic ketone with the empiric formula C_6H_8O. The symp-

toms produced by urinoid ordinarily are: nausea, headache, loss of appetite, heaviness of the stomach after meals, twitching, irritability of temper, mental dulness, physical weariness, drowsiness, dyspnea, convulsions and a state of non-irritability. Urinod appears to be one of the most toxic substances in urine. Cases are cited by Hartman in which there have been indications of urinod retention in the body. The symptoms of urinod poisoning resemble the nervous symptoms of uremia. Urinoid retention, therefore, might partly account for these nervous symptoms.

36. **Studies on Pathologic Physiology of Heart.**—It is concluded by Wiggers (1) that the characteristics changes of the pressure curve in the central vessels, as recorded by optical manometers, cannot be explained by any reflex vasometer mechanism set in operation by the production of an insufficiency, and (2) that the dynamic changes are accounted for by the fact that an aortic regurgitation increases the initial intraventricular tension, owing to a regurgitation of pressure during diastole; this, in turn, causes a more vigorous ejection of a larger blood volume in the early portion of the next systole. This may be accompanied by an actual decreased ejection during the latter portion of systole, thus, at once, accounting for the facts (a) that the systolic decline becomes steeper and (b) that the total systole output may not increase appreciably beyond normal.

Boston Medical and Surgical Journal

July 15, CLXXIII, No. 3, pp. 75-112

37 Newer Views of "Cancer," and Their Present Relation to Responsibility of Practitioner. E. Reynolds, Boston.
38 Surgical Treatment of Cancer of Cervix Uteri. F. Cobb, Boston.
39 Inoperable Uterine Carcinoma. Method of Applying Heat in Its Treatment. J. F. Percy, Galesburg, Ill.
40 Case of Pyelonephritis, Complicated by Adenocarcinoma and Chyluria. E. T. Gray, Boston.
41 Limitations of Radical Operation for Cervical Cancer of Uterus. H. T. Hutchins, Boston.

Bulletin of Medical and Chirurgical Faculty of Maryland, Baltimore

July, VIII, No. 1, pp. 1-18

42 *Pollinosis (Hay Fever)—Consideration of Its Treatment by Active Immunization. S. Oppenheimer and M. J. Gottlieb, New York.

42. **Pollinosis.**—The technic which Oppenheimer and Gottlieb followed during 1913 and 1914 has given an effective antigen for curative purposes. The pollen was ground up for several days with sand and a sufficient amount of 5 per cent. sodium chlorid solution with 0.5 per cent. phenol (carbolic acid) added to prevent the growth of micro-organisms. This mixture was placed in the thermostat for seventy-two hours at 37 C. and then filtered by suction. None of these extracts by this method gave the biuret reaction and few gave a positive ninhydrin reaction. The filtered extract was then precipitated with eight parts of absolute alcohol and filtered quickly in a Buchner funnel to avoid any denaturization, if possible, of the active principle by so strong a concentration of alcohol. The precipitate was dried and weighed. This precipitate, on testing has never given a biuret or ninhydrin reaction. It is partly soluble in 0.85 per cent. sodium chlorid and physiologically active in very weak solutions. A total nitrogen content of one of the extracts of ragweed was performed and it showed 0.066 per cent. of nitrogen. This same solution, on Dec. 20, 1913, gave a positive ninhydrin reaction, whereas on March 24, 1914, three months later, the test was doubtful. This shows that pollen extracts in solution deteriorate on standing. The dried precipitate was dissolved in 0.85 per cent. sodium chlorid solution with 0.25 per cent. of phenol, and serial dilutions made. With these solutions the patients were treated by hypodermic injections.

Eleven patients were treated in 1914, before and during the season for autumnal catarrh. Six patients were treated in advance of the attack. One of these was cured for the season, four had very mild symptoms, and one was not improved. Five patients were treated during the attack. The symptoms of four subsided after receiving from one to four injections, whereas one patient received no benefit. Altogether there were five cures for the season. In four patients there was marked improvement. Of the two patients that were not improved, one had a polypoidal degeneration of the middle turbinate and underlying bone necrosis. The patient had distinct asthmatic attacks every night and it was impossible to say whether the attacks were due to the pollinosis or to the local nasal condition. The other was a physician who reacted both to ragweed and goldenrod pollen. He received in all thirty-three injections, alternating the ragweed and the goldenrod extracts. He came very irregularly for treatment. It is possible that at times the treatment was too intensive and his physical condition was so poor that possibly he could not develop a tolerance. Nine of the patients reacted to ragweed pollen and two reacted to that of both ragweed and goldenrod. Both of these latter patients received both goldenrod and ragweed antigen hypodermically. One was cured but the other was not improved. The best time to begin treatment is probably about ten weeks before the attack may be expected to occur. Regularity of attendance at about weekly intervals is important. The authors feel that cures were not accomplished in two patients because treatment was begun too early; and in two other patients, because they were treated too irregularly. Furthermore, it is probable that some of these cases were susceptible to pollen other than that of ragweed and goldenrod.

Illinois Medical Journal, Chicago

June, XXVII, No. 6, pp. 413-484

43 This Generation's Contribution to Progress of Medicine. A. L. Brittin, Athens.
44 Clinical and Experimental Study of Postoperative Ventral Hernia. W. Bartlett, St. Louis.
45 Early Diagnosis of Pulmonary Tuberculosis. R. H. Babcock, Chicago.
46 What Constitutes Proper Carbohydrate and Protein Diet in Treatment of Tuberculous. J. Ritter, Chicago.
47 Case of Tuberculosis of Larynx. J. Holinger, Chicago.
48 Tuberculin in Diagnosis and Treatment. M. Maxey, Mount Vernon.
49 Treatment of Carcinoma of Uterus. M. W. Bacon, Chicago.
50 Deformities of Nasal Septum and Their Correction. E. F. Garraghan, Chicago.
51 Morphin and Cocain Addiction with Special Reference to Prognosis. H. W. Powers, Wauwatosa, Wis.
52 Case of Juvenile Paresis. E. F. Leonard, Chicago.
53 Perineal Lacerations. T. H. Lewis, Martinsville.
54 Prognosis in Eye Injuries. R. J. Tivnen, Chicago.
55 Preinstitutional Care of Insane. C. C. Ellis, Dunning.
56 Relaxation of Muscles in Treatment of Fractures. A. J. Graham, Chicago.
57 Nitrous Oxid and Oxygen Analgesia for Obstetrics from Anesthetists' Viewpoint. E. O. Luther, Chicago.

Journal of Abnormal Psychology, Boston

June-July, X, No. 2, pp. 81-152

58 Anger as Primary Emotion and Application of Freudian Mechanisms to Its Phenomena. G. S. Hall.
59 Necessity of Metaphysics. J. J. Putnam, Boston.
60 Remarks on Dr. Coriat's Paper "Stammering as Psychoneurosis." M. Solomon, Chicago.

Journal of Infectious Diseases, Chicago

July, XVII, No. 1, pp. 1-275

61 *Etiology of Typhus Exanthematicus. H. Plotz, P. K. Olitsky and G. Baehr, New York.
62 Elmhurst Epidemic of Sore Throat and Virulence of Streptococci Isolated from Milk. E. C. Rosenow and V. H. Moon, Chicago.
63 Predominance Among Members of Bacillus Coli Group in Artificially Stored Water. W. W. Browne, New York.
64 *Method of Transmitting Known Numbers of Trypanosomes; Numeric Relation of Trypanosomes to Infection. J. A. Kolmer, Philadelphia.
65 Coccidiosis in Cattle and Carabaos. C. H. Schultz, Manila.
66 Reaction of Bacteriologic Culture Media. W. M. Clark, Washington, D. C.
67 Characteristics of Bacteria of Colon Type Occurring on Grains. L. A. Rogers, W. M. Clark and A. C. Evans, Washington, D. C.
68 Differentiation of Bacteria of Colon-Aerogenes Family by Use of Indicators. W. M. Clark and H. A. Lubs, Washington, D. C.
69 Chromogenesis in Cultures of Sporotricha. D. J. Davis, Chicago.
70 Numerical Interpretation of Fermentation-Tube Results. M. H. McCrady, Quebec, Canada.
71 Complement Fixation in Hog Cholera. D. J. Healy and W. V. Smith, Lexington, Ky.
72 *Bacteriology of Ulcer of Stomach and Duodenum in Man. E. C. Rosenow and A. H. Sanford, Rochester, Minn.
73 Variability of Fermentative Reaction of Bacteria, Especially Streptococci. W. C. Thro, New York.

74 Infection with Paratyphoid Bacillus (B. Paratyphosus B.). E. E. Irons and E. O. Jordan, Chicago.
75 Inhibitory Action of Heterologous Protein Mixtures of Anaphylaxis. J. H. Lewis, Chicago.
76 Anaphylactic Reaction with So-Called Proteoses of Various Seeds. H. G. Wells and T. B. Osborne, New Haven, Conn.

61. **Etiology of Typhus Exanthematicus.**—In the experiments cited it has been shown a bacillus, identical with that recovered from patients with typhus, was isolated by the authors from the blood of animals in which the disease had been reproduced by inoculation of typhus blood. In such animals, the frequency of the bacilli in the blood was directly proportionate to the severity of the illness. In individual animals it was greatest at the height of the disease. It was also noted that with the bacilli isolated from epidemic cases of typhus, it is possible to reproduce the disease in animals. And furthermore, at the height of the disease in such animals, the identical organism can be recovered from the circulating blood. Finally, it was found that typhus blood is only infective if it contains a sufficient number of these bacilli. From these observations and the results of the bacteriologic and serologic studies, the authors believe themselves justified in concluding that this bacterium is the causative agent in typhus exanthematicus.

The organism is a small, pleomorphic, obligatory anaerobic gram-positive bacillus, not motile, not encapsulated and not acid-fast. Its length varies from 0.9 to 1.93 microns, its breadth being from one fifth to three fifths its length. Most of the organisms are straight; occasional ones are slightly curved. Coccoid forms also occur. The ends are rounded or slightly pointed. In smears from solid mediums, the organisms lie end to end, side by side, or at angles to one another, there being no definite arrangement. Degeneration and involution forms appear early, so that after repeated transplants the organism may assume a different morphologic appearance from the bacilli in the original culture. The organism produces no spores. Polar bodies are occasionally demonstrable with the pyoktanin, acetic acid, Bismarck brown stain. When present, they usually appear at one end of the bacillus, but may appear at both ends. The organism grows much better in solid than in fluid mediums; in solid mediums it requires carbohydrate and serum; the optimal medium in the studies thus far made is 2 per cent. glucose serum agar. For keeping the organism alive, however, 0.5 per cent. glucose serum agar was used, as the larger glucose content was presumed to decrease virulence to a greater extent.

64. **Transmission of Trypanosomes.**—A method for transmitting approximately known numbers of trypanosomes, which has proved comparatively simple, fairly accurate, and very useful has been worked out by Kolmer. By this method, it is possible to infect a large series of rats with any desired number of trypanosomes, in a sterile manner, and without sacrificing the seed animal. The method consists in securing a definite volume of blood in a blood corpuscle-counting pipet and mixing it with a definite amount of diluting fluid that hemolyses the erythrocytes, and fixes and stains the trypanosomes. The trypanosomes are then counted by means of a Thoma-Zeiss counting chamber and the number in a cubic centimeter of undiluted blood calculated. With this data at hand, 0.1 c.c. of blood is drawn aseptically from the heart of the seed animal in 0.9 c.c. of a 10 per cent. solution of sodium citrate in normal salt solution. With this blood, dilutions are made in warm, sterile, normal salt solution until a cubic centimeter or a fraction thereof contains the required dilution and number of trypanosomes determined on for the purpose of infecting a series of rats, or for any other purpose.

72. **Bacteriology of Gastroduodenal Ulcer.**—Rosenow and Sanford record the results of cultures and of the histologic examination of the tissues in a series of ulcers and lymph glands draining the ulcers, excised at operation. Cultures have been made from ulcers or regional lymph glands or from both in thirty-one cases. Chronic appendicitis was associated with ulcer in seven of the cases, cholecystitis in five, and pancreatitis in three. Appendicitis, ulcer, and cholecystitis coexisted in two cases; ulcer, cholecystitis and pancreatitis in one case. The age of the patients ranged from 20 to 72 years. The duration of the symptoms of ulcers at the time of operation ranged from six months to twenty-three years. Cultures were made from the wall of ulcers in twenty-four cases. In these, streptococci were isolated in varying numbers (1-5,000 colonies) in pure culture from nine ulcers, and in mixtures in all but one of the remaining fifteen. In two cases of duodenal ulcer (of one and twelve years' duration), in which the ulcers were so situated as to make their total removal impossible, the usual streptococcus was isolated from a thin layer of the inflamed peritoneum directly over the ulcer, and in one from the hyperemic parietal peritoneum directly opposite the ulcer. In the former, diplococci were demonstrated in the tissue. In the latter, this was not attempted. Nonhemolysing staphylococci were isolated from ten cases, but never in pure form. *Staphylococcus aureus* was found in one ulcer, but not in pure form. *Bacillus welchii*, in small numbers, was found in the ulcers or glands in four cases. They developed only in those tubes containing a large amount of the emulsion. A gram-positive bacillus, probably belonging to the subtilis group, was found in six cases and a large unidentified gram-negative bacillus in three. The colon bacillus was found in rather large numbers in two patients after death, and in small numbers in a duodenal ulcer in one patient during life. Yeast cells were isolated in large numbers from three ulcers and in small numbers from one. A few sarcinae were grown in one case, and diphtheroid bacilli in three cases.

Lymph glands draining the ulcers were cultured in eleven cases. Of these, five appeared to be sterile, four yielded streptococci in pure culture, two streptococci together with a few colonies of *Bacillus welchii*. Colon bacilli were not found in any of the glands. The glands which proved sterile were all from cases of ulcer of long standing in which no exacerbation of symptoms occurred shortly before surgical intervention. The apparently almost constant occurrence of streptococci in the depths of human ulcer, commonly the more numerous the younger the ulcer and the more marked the cellular infiltration, to the total or almost total exclusion of other bacteria, and the fact that when injected into animals such streptococci show a marked tendency to localize in the stomach or duodenum, a property which other strains of bacteria isolated do not possess, taken in conjunction with clinical facts, the authors believe constitutes good evidence that the streptococci are not merely accidental secondary invaders of the tissues, but are commonly the original cause, as well as the important factor in preventing the healing of the ulcer.

Journal of Nervous and Mental Disease, Lancaster, Pa.

June, XLII, No. 6, pp. 321-464

77 Cerebral Morphology in Its Relation to Cerebral Localization. C. K. Mills, Philadelphia.
78 Nervous and Mental Diseases and Newer Pathology. F. X. Dercum, Philadelphia.
79 Morphology and Functions of Corpus Striatum. J. H. Lloyd, Philadelphia.
80 Psychology of Misers. C. W. Burr, Philadelphia.
81 Remarks on Central Representation of Sensation. W. G. Spiller, Philadelphia.
82 Founders and Work of Philadelphia Neurologic Society. T. H. Weisenburg, Philadelphia.
83 American Neurologic Association. G. W. Jacoby, New York.
84 American Neurology of Past and Future. M. Prince, Boston.
85 Neurology in West. H. T. Patrick, Chicago.
86 Nerve Physicians and Other Physicians. H. M. Thomas, Chicago.

Journal of Sociologic Medicine, Easton, Pa.

June, XVI, No. 3, pp. 133-196

87 Rules and Regulations in Operating Plants—Carelessness and Recklessness. J. B. Lowman, Johnstown.
88 Health Measures Affecting Factory Employees—Remarks on Medical Phases of Such Legislation. J. E. Tuckerman, Cleveland.
89 Happiness as Factor in Efficiency. W. Hutchinson, New York.
90 Industrial Injuries; Treatment. W. L. Estes, So. Bethlehem.

Lancet-Clinic, Cincinnati

July 3, CXIV, No. 1, pp. 1-28

91 Gastric Carcinoma.. D. W. Palmer, Cincinnati.
92 Malignancy in Case of Ulcerative Sigmoiditis. T. H. Kelly, Cincinnati.

93 Cancer. W. D. Haines, Cincinnati.
94 Carcinoma of Rectum—Selection of Cases—Third Sphincter. G. B. Evans, Dayton.
95 Recent Advances in Cancer Problem. M. Casper, Louisville, Ky.

July 10, No. 2, pp. 29-52

96 Removing Visible Restraint from Harmless Insane. W. H. Solle, Chicago.
97 Diagnostic Value of Stained Blood Film with Especial Reference to Differential Leukocyte Count. E. F. Horine, Louisville, Ky.
98 Clean Milk as Factor in Reduction of Infant Mortality. A. Friedlander, Cincinnati.
99 Allen Treatment of Diabetes Mellitus. L. G. Heyn and P. R. Hawley, Cincinnati.
100 Organs of Special Senses in Life Insurance. W. A. Peterson, Chicago.

Laryngoscope, St. Louis

June, XXV, No. 6, pp. 321-384

101 Cases of Nasal Deformity Corrected by Bone Transplantation. W. W. Carter, New York.
102 End-Results of Radical Mastoid Operation. S. M. Smith, Philadelphia.
103 Case Showing Bipolar Origin of Faucial Tonsil. N. Schoolman, Chicago.
104 Chorda Tympani Nerve in Otology. C. E. Perkins, New York.
105 Transitional Epithelium in Rhinopharynx. W. S. Bryant, New York.
106 Simple Inflammatory Stenosis of Esophagus. R. McKinney, Memphis, Tenn.
107 Partial Paralysis of Soft Palate Following Removal of Tonsil and Adenoids. D. Roy, Atlanta, Ga.
108 Gold Platinum Inserted in Middle-Ear for Adhesive Processes in Middle-Ear. S. H. Large, Cleveland.

Medical Record, New York

July 17, LXXXVIII, No. 3, pp. 89-130

109 Bacterial Flora of Trees and Men. S. J. Maher, New Haven, Conn.
110 Autonomous Nervous System and Gastro-Enteric Functions. C. S. Fischer, New York.
111 *Internal Aspects of Prostatic Suppuration. H. Brooks, New York.
112 Nature of Neuroses. L. Casamajor, New York.
113 Staphylococcus Septicemia Complicated by Subpectoral Abscess. G. A. Rueck, New York.
114 Some Difficulties in Diagnosis of General Paralysis of Insane. W. F. Rice, Washington, D.C.
115 An Improved and Simplified Technic for Autoserotherapy. E. E. Palmer and W. L. Secor, Kerrville, Tex.

111. Internal Aspects of Prostatic Suppuration.—Throughout the entire course of the process until the pus finds escape, Brooks says, the chief clinical characteristic of the disease is the prostration which in many if not most instances exactly approximates that of a true typhoid. A very astonishing feature of the disease may be the lack of localizing symptoms. In several cases seen by Brooks no local complaints whatever have been made by the patient and the condition has been discovered only when pus appeared in the urine, when a perineal abscess pointed, or when as a matter of clinical routine a rectal examination disclosed the origin of the disease picture. The chief points in early differential diagnosis are mostly those of laboratory detail. The Widal reaction is always absent, though, as in most febrile conditions, it may be simulated at times. Blood and urine cultures are negative as to typhoid and paratyphoid bacilli. The final and absolutely diagnostic feature of the syndrome is the examination of the prostate per rectum, and the consequent discovery of an abscess or of a prostatitis. The treatment of the condition is surgical. In cases in which the operation is refused or deemed unwise Brooks suggests the possibility of successful vaccine treatment.

New York Medical Journal

July 17, CII, No. 3, pp. 117-168

116 Psychology of Stammering. G. H. Makuen, Philadelphia.
117 Irrigation, Transinsufflation and Visualization on Intestines by Duodenal Tube. I. O. Palefski, New York.
118 Syphilis of Nervous System. W. V. P. Garretson, New York.
119 Unsuccessful Adenoid Operations. W. Brady, Elmira.
120 Microscopic Localization. P. A. Sheaff, Philadelphia.
121 Late Congenital Syphilis. S. Berkowitz, New York.
122 Prevention of Syphilis. A. W. Stillians, Chicago.
123 Gouty Individual. W. R. Stone, New York.
124 Life Insurance and Kidneys. J. S. Lankford, San Antonio, Tex.
125 Pulmonary Tuberculosis and Diathermia. A. C. Geyser, New York.
126 Treatment of Diarrhea. J. C. Simpson, Philadelphia.
127 An Improved Urethroscope. E. G. Ballenger and O. F. Elder, Atlanta, Ga.

Old Dominion Journal of Medicine and Surgery, Richmond, Va.

June, XX, No. 6, pp. 315-366

128 Toxemia in Its Relation to Certain Mental and Nervous Disorders. J. K. Hall, Richmond.
129 Some Theoretical Aspects of Vaccine Therapy. E. C. L. Miller, Richmond.
130 Some Facts and Vagaries Viewed from Medical Standpoint. B. C. Keister, Roanoke.
131 Unreliability of Aconite. J. S. Wine and J. C. Ford, Richmond.

Southern Medical Journal, Birmingham, Ala.

July, VIII, No. 7, pp. 557-648

132 Cancer Problem. J. C. Bloodgood, Baltimore.
133 Cancer and Pre-Cancerous Conditions. M. H. Biggs, Rutherfordton, N. C.
134 Cancer of Breast. W. L. Rodman, Philadelphia.
135 Operative Treatment of Chronic Intestinal Stasis. W. S. Bainbridge, New York.
136 Pathology and Treatment of Cutaneous Cancer. H. H. Hazen, Washington, D. C.
137 Importance of Destroying Cervical Mucosa in Subtotal Hysterectomy as Cancer-Preventing Measure. G. T. Tyler, Greenville, S. C.
138 Early Diagnosis of Cancer of Rectum. E. H. Terrell, Richmond, Va.
139 Diagnosis and Treatment of Ectopic Pregnancy; Report of Cases. W. C. Gewin, Birmingham.
140 Postoperative Results in Nine Cases of Gastro-Enterostomy, with One Case in which More Than Two-Thirds of Stomach was Resected for Cancer. G. Torrance, Birmingham.
141 Central Nervous System in Its Relation to Certain Traumatic Affections. J. N. Baker, Montgomery.
142 Traumatic Epilepsy (?); Case Report. C. V. Stephenson, Centerville, Tenn.
143 Heart Arrhythmias. E. C. Thrash, Atlanta, Ga.
144 Causes of Indigestion; Study of One Thousand Cases. D. VanderHoof, Richmond, Va.
145 Management of Functional Nervous Affections. T. A. Williams, Washington, D. C.
146 Present Status of Local Health Administration; Outlook. O. Dowling, Shreveport, La.
147 Condensed Skimmed Milk Menace. M. M. Carrick, Dallas, Tex.
148 Filarial Infection — Investigation of Its Prevalence in Charleston, S. C. F. B. Johnson, Charleston, S. C.
149 Asthenopic Symptoms Relieved by Correcting Slight Errors of Refraction. T. W. Moore, Huntington, W. Va.

Southwest Journal of Medicine and Surgery, El Reno, Okla.

July, XXIII, No. 7, pp. 193-228

150 Cancer of Uterus. H. S. Crossen, St. Louis.
151 Non-Surgical Treatment of Malignant Growths. E. S. Lain, Oklahoma City.
152 Part General Practitioner Must Play in Control of Cancer. A. E. Hertzler, Kansas City, Mo.
153 Prevention of Gastric Cancer. C. J. Fishman, Oklahoma City.
154 Carcinoma—Early Danger Signals. L. Long, McAlester.

West Virginia Medical Journal, Wheeling

July, X, No. 1, pp. 1-34

155 Cancer — Its Origin, Diagnosis and Treatment. C. R. Enslow, Huntington.
156 Dangers of Cancer and Advantages of Early Operation. J. E. Cannaday, Charleston.
157 Observations on Cancer with Special Reference to Cancer of Uterus. F. L. Hupp, Wheeling.
158 Operability of Uterine Cancer. J. R. Hunter, Hansford.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Children's Diseases, London

July, XII, No. 139, pp. 193-224

1 Bacteriology of Cerebrospinal Fever. D. Nabarro.
2 Pulmonary Tuberculosis in Children. J. M. Campbell.
3 Case of Syphilis Meningovascularis, Congenital Syphilis, Choroiditis, Optic Atrophy, Herpes Zoster, Multiple Root Lesions. L. Guthrie and E. G. Fearnsides.
4 Form of Self-Mutilation of Penis in Young Boys. T. H. Kellock.

British Medical Journal, London

June 26, I, No. 2845, pp. 1073-1104

5 Trypanosomes Causing Disease in Man and Domestic Animals in Central Africa. D. Bruce.
6 What Mankind May Have Lost Through Evolutionary Development. W. A. Hollis.

7 *Early Treatment of Projectile Wounds by Excision of Damaged Tissues. E. T. C. Milligan.
8 Non-Tuberculous Hip Disease Successfully Treated by Double Splint and Over-Abduction. R. Parker.
9 Case of Concealed Accidental Uterine Hemorrhage; Spontaneous Delivery; Recovery. R. B. Johnston.
10 Technic of Analgesia in Intranasal Surgery. W. Wilson.

7. Treatment of Projectile Wounds by Excision of Damaged Tissues.—Milligan places on record a method of treatment which has given most gratifying results, and which, he says, if practiced thoroughly will materially lessen the time a wounded man is absent from the firing line. This method consists in the extirpation of the devitalized tissues. An anesthetic is given when indicated. The wound of the skin is boldly cut out with a sharp scalpel and so completely removed that clean healthy incised wound replaces the contused and infected wound made by the projectile. There should be nothing of the old wound remaining. The wound of the superficial and deep fascia should be treated in the same way. The wound of the muscle is dealt with in the same fashion. It presents, however, more difficulties because of the retraction of severed fibers, and because of the distance of the depths of the wound from the surface of the body. This latter difficulty is overcome in many cases by making larger incisions.

Removal of loose and fixed bits of obvious foreign and dead matter is essential. Ample exposure and drainage of the wound is necessary, and those wounds which are too extensive to retain a drainage tube after the above treatment do better than those in which a tube is necessary on account of their depth and narrowness. By this procedure the wound is put in the best possible conditions for the bactericidal actions of the tissues and the outpoured lymph. Milligan remarks that it is not wise to impair the resisting and offensive powers of the artificially obtained healthy tissue surfaces by the use of strong or injurious antiseptics. This method, when combined with the surgical essentials of perfect rest, cleanliness and frequent suitable dressings, has resulted in the healing of projectile wounds without any appearance of pus in wounds of the skin and of the superficial fascia.

Indian Medical Gazette, Calcutta

June, L, No. 6, pp. 201-240

11 Litholapaxy in India. D. F. Keegan.
12 Casualties in Persian Gulf. C. A. Gill.
13 Gunshot Wound; Peculiar Symptoms of Shock. G. Fowler.
14 Prevalence of Intestinal Parasites in United Provinces. J. G. Mukerji and B. Dass.
15 Beta Naphthol Poisoning Occurring During Treatment of Ankylostomiasis. W. B. Orme.
16 Suspected Case of Kedani River Fever in Federated Malay States. R. Dowden.
17 Inoculation against Plague and Pneumonia and Experimental Study of Therapeutic Methods. W. M. Haffkine.
18 Studies in Malaria. H. Stott.
19 Open Method of Treatment of Fractures. T. Jackson.
20 Case of Fish Poisoning. S. K. Mazumdar.
21 Use of Hexamethylene Tetramine in Septic Inflammations of Cornea and Conjunctiva. H. Kirkpatrick.
22 Case of Bite from Naia Tripudians; Recovery. B. R. Khisty.
23 Case of Asphyxia, Result of Inhaling Food Most Probably in Act of Vomiting. C. C. Murison.

Journal of Laryngology, Rhinology and Otology, London

July, XXX, No. 7, pp. 265-296

24 Nasal Conditions of Cerebrospinal Meningitis. E. A. Peters.
25 Lumbar Puncture in Aural and Nasal Cases; Pathology of Fluid. W. Wingrave.
26 Herpes Zoster Oticus. A. R. Tweedie.

Lancet, London

July 3, II, No. 4792, pp. 1-54

27 Trypanosomes Causing Disease in Man and Domestic Animals in Central Africa. D. Bruce.
28 *Right-Sided Murmurs of Mitral Stenosis. J. F. Goodhart.
29 Case of Congenital Hemihypertrophy. J. M. Fortescue-Brickdale.
30 *Leprosy and Kedrowsky's Bacillus. H. Fraser and W. Fletcher.
31 Two Cases of Gastric and Duodenal Perforation; Use of "Corner's Plug." H. W. Mills.
32 Case of Extraordinary Traumatic Deformity with Edema. P. C. P. Taylor.
33 An Unusual Case of Perforated Ulcer of Esophagus. G. W. Christie.

28. Right-Sided Murmurs of Mitral Stenosis.—There occurs in the later stages of mitral stenosis a regurgitant murmur over the right ventricle, and as Goodhart believes, at the tricuspid orifice, as a result of hypertrophy and dilatation of the right side of the heart. These changes may be so extreme that the right ventricle comes to occupy the place of, and thus to simulate the left ventricle at the surface, and therefore to get at the left it is necessary to go round to the inferior angle of the scapula. Further, not only is the ventricle dilated, but the pulmonary artery also and the sigmoid valves are more or less incompetent, and then there is generated a peculiar diastolic murmur at the orifice of the pulmonary artery that often has something in it of the quality of a venous murmur; it is long and sustained and sometimes musical. This murmur is quite distinct from the diastolic murmur supposed to be a long or early presystolic bruit. In collating the notes of eighty-four cases of mitral stenosis Goodhart found one or other of these murmurs present in 17 of them; the tricuspid murmur alone in 7; the pulmonary artery diastolic alone in 6; and the two were in company in 4 others.

If the quasi-mitral murmur be tricuspid as Goodhart maintains, the regurgitation would necessarily produce a reflux in the veins and appear as a pulsation in the neck, with other evidences of backward pressure, but it is a fact that in some of these cases there may be no such pulsation, for having paid special attention to this point Goodhart has often found it absent, or inappreciable. The external jugulars may even be found full yet not pulsating. Whenever the patient is suffering by default of the left ventricle even when it may be especially due to an overtaxed right, Goodhart says, digitalis may be expected to do good; convallaria may be useful; opium is often better still, by steadying the heart's action, and perhaps better than all in bad cases come leeches or venesection. There are other important points also pointing in the same direction of lessening the volume of the circulation. Diet also needs consideration. Many of these people find out for themselves, that they are only comfortable when their meals are of the smallest. A small piece of fresh and tender meat, with a piece of toast and a little junket or custard, are better than much vegetable and stodgy pudding. Further, a great deal of good may often be done by limiting the food entirely for a week or ten days to buttermilk or whey, or even water.

30. Leprosy and Kedrowsky's Bacillus.—Material was excised by Fraser and Fletcher in fifty-two nonulcerating cases of nodular leprosy. There was in every case abundance of acid-fast bacilli in the tissues excised and inoculated on the large variety of mediums employed, including those of Kedrowsky and Bayon.

Bulletin de l'Académie de Médecine, Paris

June 15, LXXIII, No. 24, pp. 685-706

34 *The General Shock from Explosions. (Des variations du "syndrome commotionnel," suivant la nature des traumatismes, et de son unité.) A. Mairet, H. Piéron and Bouransky.
35 Diplococcus Typhoidal Meningitis. (Typho-diplococcie et méningite cérébro-spinale.) A. Sartory, L. Spillmann and P. Lasseur.
36 Functional Myocardial Insufficiency Sequel to Articular Rheumatism. (Les troubles cardiaques discrets des rhumatisants sans lésions valvulaires ni péricardiques.) C. Lian.

34. The Shock from Shell Explosions.—Mairet discusses the various elements of the shock from explosion of a shell nearby, without direct injury, as he has encountered it in twenty-one cases. In this "global commotional syndrome," as he calls it, we recognize features of the various disturbances that have been signaled for years as following severe accidents or violent emotions, railroad, factory or mine accidents, the Messina earthquake, etc., and observed in the Russo-Japanese war. The various manifestations are innumerable and widely diverse, but there is a unity in the syndrome, and this is the general perturbation, the commotion.

Presse Médicale, Paris

June 17, XXIII, No. 27, pp. 213-220

37 *Lavage of the Spinal Canal in Cerebrospinal Meningitis. C. Aubertin and H. Chabanier.

38 Prophylaxis of Typhoid. A. Colard.
39 Inheritance of Immunity to Tuberculosis. (L'hérédité tuberculeuse.) C. Sabourin.

June 24, No. 28, pp. 221-228

40 The "Trench Echo" and the "Devil's Bugle." (Les journaux des tranchées.) F. Helme.
41 Necessity for Routine Operations for Abdominal Wounds. R. Leriche.
42 *Resection of Wounded Knee Instead of Amputation. T. Tuffier.
43 Wounds from Hand Grenades and Other Close Firing. (Les plaies par "crapouillots.") L. Devraigne.

37. **Rinsing Out the Spinal Canal in Meningitis.**—Aubertin says that he has been impressed with the extremely thick consistency of the pus obtained by lumbar puncture from men with cerebrospinal meningitis brought to the hospital in coma in the course of the epidemic of this disease now prevailing among the soldiers quartered around Paris. Instead of the usual technic for lumbar puncture, he withdrew 50 or 60 c.c. of the purulent fluid from the seated patient and injected a like amount of saline, then waiting a few minutes, repeated the procedure two or three times until the spinal canal was thus cleared out. The concluding injection was of 50 c.c. of antimeningococcus serum. The whole procedure seemed entirely harmless in the fifty cases in which it was applied, and the beneficial influence was promptly apparent. The amount of pus thus cleared out is considerable; it formed on settling fully half of the fluid withdrawn in some cases.

42. See Paris Letter in THE JOURNAL, July 10, p. 183.

Revue Médicale de la Suisse Romande, Geneva

June, XXXV, No. 6, pp. 297-360

44 *Operative Treatment for the Gastric Crises in Tabes. G. Patry.
45 Two Months of Military Surgery. E. Gay.
46 Advantages of Combining Epinephrin with a Longer Acting Vasoconstricting Substance. (Action synergique de corps vasoconstricteurs dans l'anesthésie locale.) J. Burmann.
47 Instrumental Reduction of Dislocated Lower Jaw. (Luxation invétérée du maxillaire inférieur. Réduction à la clef anglaise.) C. Roux.
48 Eyeball Struck by Mother Owl. A. Collomb.

44. **Operative Treatment for Gastric Crises in Tabes.**—Patry compares a personal case with the literature on this subject, his conclusions being that operative measures are justified in distressing cases, notwithstanding the high mortality, the difficult technic and the liability to recurrence. He operated by Guleke's technic which obviates many of the complications of the Förster and Franke methods. The technic proposed by Sauvé and Tinel seems still more promising, but it has not been applied in the clinic alone to date, to his knowledge. Their suggestion is to ligate the intercostal nerves between the ganglion and the dura (THE JOURNAL, 1913, lx, 1111). Patry's patient was a man of 53, and marked improvement in the general condition and relief of the pains followed, but nothing has been heard from the man during the two years since he left the hospital, six weeks after the operation. The seventh, eighth and ninth pairs of posterior roots were resected; then as the tenth right root was severed, the heart and lung action suddenly stopped, but the heart started up again in ten seconds and pressure on the thorax started breathing anew. This reflex can be avoided by deadening the sensibility of each nerve in turn just before it is cut.

Deutsche medizinische Wochenschrift, Berlin

June 10, XLI, No. 24, pp. 697-724

49 Symptomatology and Treatment of Typhoid, and Preventive Vaccination. F. Schultze.
50 *Subcutaneous Symphyseotomy. E. Vogt.
51 Gastro-Colon Ptosis. O. Strauss.
52 Bullet Wounds of Stomach and Intestines. (Verletzungen von Magen und Darm durch das Infanteriegeschoss.) H. Boit.
53 Treatment and Prognosis of Extensive Wounds of the Urethra. (Harnröhrenzerreissungen.) Bonne.
54 *Capillary Drainage After Wounds of Blood Vessels. (Neue Behandlungsmethode von Verletzungen grösserer Gefässe und Aneurysmen mittels Kapillardrainage und breitester Vereinigung der Wundflachen.) W. Rühl.
55 Induced Retardation of Local Pulse as Test for Femoral Aneurysm. Wigdorowitsch.
56 Rabbit Meat. (Wert des Kaninchenfleisches für die Volksernährung. II.) Schottelius.

50. **Subcutaneous Symphyseotomy.**—Vogt analyzes the experiences at Dresden with this method of facilitating delivery with dystocia, as applied in thirty cases. In seven the pelvis was extremely contracted. The operation was not used for primiparas except in two whose vagina was very wide and there was comparatively little danger of its tearing during delivery. The great advantage of symphyseotomy is that it allows the accoucheur to wait for spontaneous delivery. This occurred in nineteen cases; the others required intervention in the interests of the child. Good labor contractions are indispensable for spontaneous delivery, and intramuscular injection of hypophysis extract may be necessary for this. He makes the injection while the woman is still on the table and generally waits until the head enters the pelvis and thus all danger of prolapse of the cord is past, before she is taken back to bed. The interval before expulsion ranged from three minutes to four hours and forty minutes, the longest interval in one primipara with rigid soft parts. There were no signs of injury of bladder or urethra in any instance except that in one case the urine was transiently blood stained. No by-effects nor complications were observed. The button-tipped knife protects against possible injury of the peritoneum, but there may be a hematoma of venous blood and aseptic thrombosis in the veins in the vicinity. Embolism was never encountered but absorption of the hematoma was probably responsible for the febrile course of the puerperium in 44 per cent. of the thirty cases and in 38 per cent. of Frank's 140 cases. There was infection in only one of Vogt's thirty cases. The uterus of one woman had already ruptured before the operation was done, and this was not suspected. All the other women made a smooth recovery, and all but three of the children were born in good condition; the symphyseotomy was unable to save these three. There has been much less extravasation of blood and less tendency to thrombosis since a small, curving button-tipped knife has been used to scrape away the ligaments and corpora cavernosa of the clitoris from the edge of the bone. When this is done gently and cautiously there is no bleeding from the corpora cavernosa.

54. **Treatment of Wounded Blood Vessels.**—Rühl relates experiences which show that the usual gauze tamponing of a wounded blood vessel invites infection while interfering with normal healing. The drainage should be merely capillary, a thread laid smoothly into the depths, stopping short of contact with the vessel. A row of four threads will thus effectually drain an ordinary vessel wound after the vessel has been ligated above and below the injury. With extensive wounds a wick of gauze might supplement the thread, but the gauze should not extend more than half way the length of the thread.

Jahrbuch für Kinderheilkunde, Berlin

June, XXXI, No. 6, pp. 465-562

57 *Measles in Two Infants, Sixteen and Eighteen Days Old. M. Winter.
58 Anal Stenosis in Boy of 7 Simulating Hirschsprung's Disease. O. Sachs.
59 *Management of Whooping-Cough. (Zur Lehre vom Keuchhusten.) A. Czerny.
60 Hypersusceptibility to Tuberculin and the Reverse Condition Realized Under Tuberculin Treatment. (Die Tuberkulinüberempfindlichkeit und die durch Tuberkulindarreichung zu erzielende Tuberkulinunempfindlichkeit.) G. Bessau. Commenced in No. 5.

57. **Measles in Young Infants.**—Winter has compiled a number of cases from the literature in which the mother and infant developed measles together a few days after its birth, the infection having apparently befallen both while the child was still in the uterus. In Ballantyne's case the measles seemed to have been responsible for the premature delivery, and the child presented the typical eruption when born. In contrast to these experiences, Winter has been unable to find records of any cases of extra-uterine acquired measles in infants less than 5 months old except in an account of an epidemic in Ireland, and this does not state the exact age of the infants, so that in some or all of the cases the infection might have been intra-uterine. Sperk asserts of measles

that it occurs only rarely in infants from 1 to 3 months old; between the third and fifth months in about 50 per cent. and declares that all exposed infants from 6 to 12 months old develop measles. These facts render interesting Winter's report of a measles eruption developing in two infants at the sixteenth and eighteenth days of life. There had been prodromal symptoms the day previous in both cases. The mother of the youngest babe had developed measles just one day before, but in the second case the mother did not have measles. Winter adds that as the incubation period of measles is generally accepted as from thirteen to sixteen days, the children must have become infected the first and the third days after birth.

59. **Pertussis.**—Czerny relates that for eighteen years he has made a practice of refraining from isolating children with whooping cough, as he has found that a few simple precautions are all that is necessary to prevent infection of others with this disease. Every child that coughs is regarded as a pertussis suspect, and is never allowed to come closer than 1.5 meters (about 5 feet) to the other children. No droplets can be expelled by a child farther than this, and the disease is not carried by the attendants' hands or clothing. No cubicles or boxes are necessary, merely reliable attendants to see that none of the pertussis children approach nearer than 5 feet to any of the other children in the ward. By care in this way there need be no fear of a child's contracting pertussis when in the hospital for some other disease. He has never had whooping cough spread in the institution. In the home, if the pertussis child is never allowed to approach his brothers and sisters nearer than 5 feet, they will not contract whooping cough from him. The above applies only to children over a year old. Infants are peculiarly susceptible to pertussis and the attendants are liable to convey infection from one babe to another. When each infant has its own nurse, this does not occur. Infants are peculiarly susceptible to infections of the nose and throat, and they begin to cough on the slightest provocation, and the cough is liable to be of a spasmodic type. His extensive research has not demonstrated any causal connection between the Bordet-Gengou bacillus and pertussis. It was found only sixteen times in forty-two cases but Inaba was able to cultivate it from seventy-seven of eighty-one cases. Czerny has always found pronounced lymphocytosis in the cases of pertussis examined for it, so that the absence of lymphocytosis justifies exclusion of pertussis in a child with spasmodic cough. The spasmodic cough also may persist as a purely nervous phenomenon after the pertussis mucosa affection has long healed. The contagious phase seems to end with the subsidence of the lymphocytosis, but proof of this is difficult to produce. The younger the child the greater the liability to spasm of the larynx with every cough. Infections are liable to induce tetany, and especially laryngospasm. Another sign that the nervous excitability is increased in pertussis is that the zone in which the knee-jerk can be elicited is much wider than in normal conditions. A tap anywhere in the vicinity of the tendon elicits the reflex. Czerny's experience with restriction of fluids in treatment of affections of the air passages has been so favorable that he suggests its systematic application in pertussis.

Monatsschrift für Geburtshülfe und Gynäkologie, Berlin

June, XLI, No. 6, pp. 457-526

61 *Transparency of Abdominal Walls in Pregnancy at Term. F. Ahlfeld.
62 Advantages of Index Finger Alone for Internal Examination in Pregnancy. (Wie soll die innere Untersuchung Schwangerer und Gebärender ausgeführt werden?) F. Ahlfeld.
63 Clinical Experiences with Synthetic Oxytocics. (Synthetisch dargestellte Wehenmitteln.) A. Voirol.
64 *Autoinfection of Parturients. (Zur Frage der unverschuldeten endogenen puerperalen Spontaninfektion.) K. Bollag.

61. **Transparency of Abdominal Walls at Term.**—Ahlfeld has occasionally found the walls of the abdomen at or near term stretched so thin that it was possible to inspect the contents of the abdomen and actually see the pulsation of the umbilical cord as it lay over the back of the child. The woman is placed on a high couch or table, elevated so that the observer can inspect the abdomen throughout without lowering his head. In one woman the walls were so transparent that the different parts of the uterus, the ovaries and tubes could be inspected with ease, and several graphic tracings were taken of the child's breathing. The practical importance of transparent abdominal walls was confirmed by a recent case of cesarean section. Direct inspection through the abdominal walls revealed a large distended vein on the median line just where the incision would have been made if the vein had not been seen in time.

64. **Autoinfection of Parturients.**—Bollag reports the case of a healthy woman of 35 spontaneously delivered of a healthy child at term without having been subjected to internal examination. The fourth day fever developed and the woman died of streptococcus sepsis a month later. The most careful scrutiny failed to reveal any focus from which the streptococci could have invaded the genital organs. The primary trouble was unmistakably streptococcus thrombosis in the internal genital organs.

Münchener medizinische Wochenschrift, Munich

June 8, LXII, No. 23, pp. 769-804

65 *Training After Wounds of the Brain. (Uebungsschulen für "Gehirnkruppel": Sprachkranke und andere Gehirnverletzte.) F. Hartmann.
66 Improved Technic for Producing Cholera Vaccine. (Cholera-impfstoff.) B. Fischer, L. Bitter, and G. Wagner. Concluded in No. 24.
67 Roentgen Treatment of Hay Fever. (Ein Versuch, den Heuschnupfen durch Röntgenstrahlen zu beeinflussen.) K. Schmidt.
68 Vaccine Therapy of Dermatomycoses. B. Bloch. Commenced in No. 22.
69 Tardy Complications After Freezing. O. Burkard.
70 Improved Technic for Cultivation of Cholera Germs. (Fleischnatronagar als Choleraelektivnährboden.) P. Esch.
71 Feeding in Typhoid. (Zur Frage der Typhusernährung im Kriege.) Rohmer.
72 Splints and Casts for the Wounded. (Unsere Schienenverbände im Felde.) A. Peiser. (Zur Gipsverbandtechnik bei Frakturen mit ausgedehnten Weichteilverletzungen.) Mayer and Mollenhauer.
73 Orthopedic Aftertreatment for the Wounded. Milner.
74 Correction of Flaccid Paralysis of the Foot. (Spitzfussstiefel.) A. Ritschl. (Zur Vermeidung der Spitzfussstellung.) J. E. Schmidt.
75 Wounds of the Eyes. (Augenerkrankungen im Felde.) M. Zade. Commenced in No. 21.
76 *Wooden Clothes-Pin to Open Locked Jaws. (Einfachste und billigste Apparat zur Dehnung der Kiefermuskeln und Bänder bei Kieferklemme.) J. Bock.
77 *Prophylaxis of Typhus. Gerwin.

65. **After-Treatment for Wounds of the Brain.**—Hartmann has opened a special department in his clinic (Graz) for men with aphasia and similar troubles resulting from a wound of the brain. Systematic training to overcome the resulting disturbances is giving very fine results, and he appeals for helpers, and for others to take up similar work elsewhere.

76. **Clothes-Pin to Pry the Jaws Apart.**—Bock relates that ordinary spring wooden clothes-pins are the most effectual means for this purpose as he has repeatedly found in his work among the wounded soldiers. The broad handle ends are worked between the teeth, and the powerful spring action exerts constant pressure to spread the jaws apart, without injuring the teeth.

77. **Protection Against Typhus.**—Gerwin advises having a wooden frame nailed to the floor to enclose the bed of a typhus patient. A groove running along the top of the frame is kept full of a strong disinfectant, and the frame where it joins the floor is smeared with medicated paraffin. This will prevent the passage of lice, and the physician is thus protected in visiting the typhus patient.

Wiener klinische Wochenschrift, Vienna

June 3, XXVIII, No. 22, pp. 579-610

78 Dysentery Y Bacilli in the Blood. A. Ghon and B. Roman. Concluded in No. 23.
79 Variability of the Dysentery Bacilli in the Galician-Russian Epidemic 1914. W. Falta and H. Kohn.
80 Typhoid Plus Dysentery. A. Galambos.
81 *Action of Papaverin and Emetin on Protozoa. E. P. Pick and R. Wasicky.

82 *Signs Enabling Detection of Epileptics. M. Benedikt.
83 Epidemic of Ulcerative Stomatitis. A. Zörnlaib.
84 Heating of Hospitals, etc. (Aufstellung der Heizkörper in Kranken- und Humanitatsanstalten.) M. Setz.

June 10, No. 23, pp. 611-636

85 *Wounds of Peripheral Nerves. O. Marburg and E. Ranzi.
86 Vaccine Therapy of Typhoid. C. Brach and J. Fröhlich.
87 Differential Diagnosis of Typhoid. K. Wagner.
88 *Palpation by Electricity. (Faradopalpation; Arsofaradisation.) M. Kahane.
89 Technic for Roentgen Work in Base Hospitals. (Zum Röntgenbetriebe in Verwundetenspitalern.) N. Swoboda.
90 Etiology and Treatment of Progressive Paralysis. A. Pilcz.
91 Treatment of Extensive Wounds of the Jaws in War. (Ueber geheilte mit umfangreichen Weichteilverletzungen verbundene Kieferschussfrakturen.) M. Kraus. Commenced in No. 21.

81. Action of Papaverin and Emetin on Protozoa.—Pick and Wasicky report that their laboratory research has amply confirmed their assumption that papaverin has the same toxic action as emetin on protozoa. Emetin has a more destructive effect on the *Paramecium caudatum* but papaverin is much more toxic for trypanosomes and the other protozoa tested. It therefore deserves a trial at least in treatment of ameba dysentery as it seems to be free from the by-effects of emetin on the heart and vessels.

82. To Recognize Epileptics at a Glance.—Benedikt states that normally the right side of the forehead is usually a little smaller and lower than the left, the right ear is farther back, the skull back of and below the right ear is more prominently developed, and other signs of asymmetrical development are evident, corresponding to the preponderant functioning of the right side. Asymmetry seems to be a prerogative of man; the animals rarely display this crossed asymmetry in physiologic conditions. He has found that it is lacking also in families inclined to epilepsy and insanity, and he urges systematic study of cranioscopy on the families with inherited taint in one's environment. The simplest form of the abnormal type is a pronounced aplasia of the right side of the skull. It is particularly significant when the aplasia on both sides causes the skull to be of a general wedge shape. The median parietal arc should be the same length as the median frontal arc. In epileptics the former is usually 3 or 4 c.c. shorter, or the proportion may be reversed. The necessity for excluding epileptics from service at the front is bringing cranioscopy into repute, as epileptics are liable to conceal their infirmity.

85. Wounds of Peripheral Nerves.—The outcome in two nonoperative and forty-eight operative cases has confirmed the necessity for waiting several weeks after all suppuration has subsided before attempting any operation on a wounded nerve unless done at once after the injury. Otherwise an operation is required when there is no response at all to electric stimuli, or the reaction of degeneration remains stationary for several weeks, or shows a progressive tendency and the motor and sensory deficit phenomena require remedying.

88. Needle Electrode.—Kahane has been using electrodes of the smallest possible diameter for diagnostic and therapeutic purposes. The method can be applied with the faradic, galvanic or high frequency current, as he describes in detail, analyzing the physical effect of each method. As the needle electrode can be thoroughly sterilized, it might be used for direct faradization of the heart muscle in case of arrested heart action in general anesthesiæ or poisoning from other cause.

Zentralblatt für Chirurgie, Leipzig

June 12, XLII, No. 24, pp. 425-440

92 Bone as Substitute for Eyeball. (Ersatz des Augapfels durch lebenden Knochen.) F. Ochlecker.
93 Fat Implant for Rebuilding the Face. (Gesichtsplastik mittels freier autoplastischer Fetttransplantation.) K. Kolb.

June 19, No. 25, pp. 441-456

94 Importance of and Technic for Saving as Much of Limb as Possible at Amputations. (Zur Vermeidung von Nachamputation.) H. Hans.
95 Dislocation of Lower End of Fibula. (Isolierte Luxatio fibulae im Talocrutalgelenk.) H. Hartleib.
96 Roentgenography of Joints from Two Angles at Once. (Zur Aufnahme von ankylosierten Gelenken.) A. Schwarz.

Zentralblatt für Gynäkologie, Leipzig

June 12, XXXIX, No. 24, pp. 409-424

97 *Symptomatology of Corpus Luteum Cysts, and Treatment. J. Halban.

June 19, No. 25, pp. 425-440

98 *Some Minor Technical Points in Obstetrics. (Betrachtungen zur geburtshilflichen Operationslehre.) K. Holzapfel.

97. Corpus Luteum Cysts.—Halban warns that menstruation is generally arrested when a cyst develops in the corpus luteum. If the cyst retrogresses or is cut out, menstruation is liable to return but then may be irregular. These features of corpus luteum cysts aid in their differentiation. Corpus luteum cysts may subside spontaneously, hence operative treatment is not advisable at first. Alternating cysts, that is, cysts that develop and retrogress in the ovaries in turn are of this type. They have very thin walls and rupture easily, even under cautious bimanual examination alone. The details of nine cases are given in which he resected a corpus luteum cyst. Two of the women were pregnant but the operation apparently did not affect the pregnancy.

98. Minor Points in Obstetric Maneuvers.—Among the points mentioned by Holzapfel is the confusion liable to result in reports and descriptions unless the directions are always given according to the direction of the parturient's body. This is especially necessary in teaching the use of the forceps. He gives a number of minute directions for this. In all cases of transverse and breech presentation, the principle should be borne in mind to use always the opposite hand. In pulling on the breech he does not exert traction as at a normal delivery, but pulls the trunk downward and back until the scapula is reached. That is, he does not pull along past the perineum but directly down on it. This gradually stretches the perineum and facilitates the later extraction of the head.

With breech delivery, the finger is the best instrument to use. He urges practicing to make it strong enough. The finger can be changed, using one after the other or two at a time, if there is room. If this or an oiled rubber tube sling does not accomplish the purpose, a hook can be used, not too narrow, slipped inside a greased rubber tube. If the perineum is extremely resistant, he stretches it with his hands or makes an incision in or near the raphe, as this is easier to suture than a side incision. But this is not necessary unless the sphincter is menaced. Any manipulation of the head by way of the rectum he stigmatizes as a crime against asepsis. It is immaterial in respect to cutting the cord whether or not the pulsation in the cord has ceased. The child's breathing and the pressure on the placenta in the uterus are the important elements here. The cord should be cut when the child's cry has been heard, and the cutting should be done during a contraction of the uterus. This latter point is especially necessary if the child is not breathing well. The first contraction of the uterus after the expulsion usually comes in less than five minutes, and while waiting for it, the child's air passages should be cleared of mucus or amniotic fluid. If the child gets too much blood from the placenta it might induce jaundice; but more blood than the minimum would certainly be an advantage. He has never seen severe jaundice develop under these conditions in the eighteen years he has followed the above technic.

Zentralblatt für innere Medizin, Leipzig

June 12, XXXVI, No. 24, pp. 373-388

99 Recurrence of Long Cured Malaria During Mercury-Salvarsan Treatment of Syphilis. E. Liebmann.

Gazzetta degli Ospedali e delle Cliniche, Milan

June 10, XXXVI, No. 46, pp. 721-736

100 *Measurement of Pressure of Cerebrospinal Fluid. S. Indelicato.
101 *Immunization and Fixation Abscesses. A. Cerioli.

June 13, No. 47, pp. 737-752

102 Biologic Reactivation of the Wassermann Reaction. A. S. d'Emidio.
103 *Epidemic Meningitis. P. Costantini.

100. Pressure of Cerebrospinal Fluid.—Indelicato declares that estimation of the pressure of the fluid merely by the way it spurts or drips is liable to mislead as to the actual tension. The manometer is indispensable for anything like precision

and for correct judgment of the underlying conditions in the case.

101. **Fixation Abscesses.**—Cerioli has modified Fochier's original technic for the fixation abscess and advocates its use not only in acute but also in chronic diseases. It might even be given a trial in nervous affections and in syphilis. In acute infectious diseases he has found it of great advantage to supplement it with serotherapy. He injects 1 c.c. of a mixture of 16 parts eucalyptol and 4 parts turpentine, instead of all turpentine. This causes a large abscess to form which shows fluctuation in time but resolution follows and usually without the abscess opening outward. The whole disappears in ten or twelve days. Only in children the abscess generally opens spontaneously. No incision and no dressing are needed therefore for adults, as the evacuation of the contents of the abscess is not the important factor, except in arsenic and lead poisoning, when the abscess is induced to carry off part of the indestructible poison. The purpose of the injection is defeated if the fluid gets into a vein and thus into the general circulation. This happened in one of his cases and transient disturbances and a strong taste of eucalyptol were noticed and no abscess developed. He gives the details of a case of puerperal fever, one of anthrax and one of a deep phlegmon in the neck, all treated by the fixation abscess and serotherapy with favorable outcome. He warns that the cessation of symptoms does not necessarily imply the death of the germs, and hence treatment should not be abandoned too early. In polyneuritis, in facial paralysis, in nodose erythema, and in acute articular rheumatism, he has obtained excellent results with the fixation abscess. In pleurisy it almost invariably renders puncture unnecessary or prevents return of the effusion after thoracocentesis. The work issues from the public hospital at Lonato and concludes with reports of the application of the method in surgical tuberculosis, injecting tuberculin later into the artificial abscess. The results seemed to be favorable. This was still more marked in some cases of sciatica. The modern theories as to vaccination, and especially autogenous vaccines, have much in common with the principle of the fixation abscess, and if the latter can be made a simple and harmless lesion, as is the case with the technic described, it seems to open a prospect of effectual mobilization of the individual defensive forces, under control, as an important aid in the treatment of the most diverse affections.

103. **Epidemic Meningitis.**—Costantini ascribes the recovery in one of the three cases reported to the intravenous injection of 2 c.c. of a 3 per cent. solution of phenol as the last resort. Two injections a day were given at first and then one a day, after failure of a persevering course of lumbar punctures and antimeningococcus serum. There were a number of other cases of meningitis in the barracks at the time but the other men recovered under serotherapy alone.

Policlinico, Rome

June 20, XXII, No. 25, pp. 821-852

104 Principles for Care of Wounded Limbs to Prevent Crippling. (Profilassi di talune debilitazioni dell'apparecchio del movimento, consecutive a traumi.) R. Dalla Vedova.

105 Chloroform as a Vermin, Helminth and Other Parasites Exterminator. (Le malattie da parassiti animali negli eserciti combattenti.) G. Alessandrini.

106 Cardiovascular Disease in the War. G. Galli.

June, Surgical Section, No. 6, pp. 265-312

107 *Polycystic Kidney. R. Mosti.

108 Urea Test of Kidney Functioning. (La prova dell'azoturia come metodo di esame della funzione renale.) E. Pirondini. Commenced in No. 5 and continued.

109 *Hot Air Jet to Promote Healing. G. Simoncelli. To be continued.

107. **Polycystic Kidneys.**—Mosti states that in the 515 cases of polycystic kidney on record the affection was bilateral in the overwhelming majority, as also in a personal case described in detail, with the histologic findings in the kidney removed. The other kidney had given evidence that it was functioning satisfactorily, but after the nephrectomy it broke down and the man died after a few days of anuria. Polycystic kidney is most common in men, and usually the patients are between 40 and 60.

109. **Hot-Air Jet to Promote Healing.**—Simoncelli has found the jet of superheated air an excellent means to stimulate and hasten the repair of torpid lesions which show no tendency to heal. On recent and active granulating wounds it does no good but rather retards healing.

Riforma Medica, Naples

June 19, XXXI, No. 25, pp. 673-700

110 *Intravenous Serotherapy of Cholera; Sixty-Nine Cases. S. Livierato.

111 *Enlargement of the Skull with Web Fingers and Toes. (L'acrocefalosindattilia di Apert considerata come una varieta fetale della cranio-sinostosi patologica.) M. Bertolotti and G. B. Trotti.

110. **Serotherapy of Cholera.**—Livierato had 147 cases of cholera in his charge during the 1913 epidemic in Italy. Serotherapy was applied in sixty-one of the severer and in twelve of the milder cases. The mortality was 55.74 per cent. in the sixty-one graver cases, while all died in the seventeen other severe cases not given serum treatment. In most of the cases he supplemented the serotherapy with intravenous injection of a hypertonic salt solution, according to Rogers. The latter had a remarkable action on the vomiting and diarrhea, but all recovered of the six patients with a very severe form of cholera who were given the serotherapy alone. The anticholera serum has an unmistakable antitoxic action and thus effectually supplements the hypertonic solution.

111. **Pathologic Synostosis.**—The girl of 5 presented an extremely typical example of the deformity of the skull and symmetrical growing together of the fingers, with six rudimentary toes on each foot—the deformity which Apert described in 1906, calling it acrocephalosyndactylia. Nine illustrations are given and the case is compared with the literature on similar deformities, and the mechanism is discussed.

Semana Medica, Buenos Aires

May 6, XXII, No. 18, pp. 561-592

112 *Calculus of the Urethra in a Woman. J. M. Caballero.

113 Functional Stomach Trouble. VI. (Hiperestenias gastricas primitivas.) T. Martini.

114 Toxicity of Certain Stains for Protozoa. (Accion de los colorantes imino y fenolicos nitrados.) L. Guglialmelli and J. J. Carbonell.

May 13, No. 19, pp. 593-624

115 *Liver and Spleen Syphilis. (Los grandes sindromas viscerales de la Sifilis.) J. J. Viton.

May 20, No. 20, pp. 625-656

116 Vaccine Therapy. (A proposito de algunas vacunas.) A. Gutierrez.

117 Medical Inspection of Rio Schools. (Cuerpo medico escolar.) M. Etchegaray.

112. **Calculus in Female Urethra.**—Caballero's patient was a multipara of 60. He removed the large calculus through an incision in the anterior wall of the urethra. By this means all danger of a fistula into the vagina was avoided. The external subsymphyseal urethrotomy was done by Legueu's technic and confirmed its advantages anew. A curving incision is made between the meatus and the clitoris, the concavity toward the former, and then the anterior wall of the urethra is incised, extending both incisions until it is easy to extract the calculus.

115. **Liver and Spleen Syphilis.**—Viton recalls that syphilitic visceral affections have no special signs to distinguish them, while many nonsyphilitic lesions simulate the clinical picture of liver and spleen syphilis. This is particularly confusing when the patient happens to be a syphilitic. The benefit from mercurial and potassium iodid treatment clears up the diagnosis for visceral as well as respiratory affections. Syphilis of the respiratory apparatus, especially syphilitic asthma, generally yields completely to specific treatment. The liver stands like a filter between the umbilical and the general circulation in the fetus, and it is easy to understand how it strains out and retains the spirochetes, and the damage that results. The liver and spleen are even more closely connected together in pathologic than in normal conditions, while the abundant blood supply of both these organs keeps them flooded with the germs when there are any in the blood stream. They enlarge in consequence, but the secondary phenomena generally dominate the clinical picture, anemia,

jaundice or ascites as the case may be, or still other secondary symptoms may predominate. He discusses each of the possible clinical pictures in turn, in both children and adults. In treatment, effusions in abdomen or chest should be aspirated out and the heart toned up, preliminary to vigorous specific treatment. The drugs act most directly, perhaps, on the liver when given by the mouth, but they should be commenced cautiously and gradually, with small doses.

Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam

June 5, I, No. 23, pp. 1927-2018

118 Laboratory Research on Irregular Heart Rhythms. (Hartbl-, tri- en polygeminie.) S. De Boer.
119 *Traumatic Injury of the Optic Nerve; Six Cases. (Verwonding van de gezichtszenuw.) J. H. A. T. Tresling.
120 Puerperal Auto-Infection. (Zelfbesmetting in het kraambed.) C. Meuleman.

119. **Wounds of the Optic Nerve.**—Tresling's six cases had nothing to do with war wounds. The injury was from an accident or a stab wound. In three cases the optic nerve was injured on the side of the trauma, in the others on the opposite side. The changes in the optic nerve tended to retrogress in two; they remained stationary in two and in two they continued a progressive course. In one case the blade of a knife was broken off in the tissues without appreciable reaction, and for nearly three weeks its presence was unsuspected although it was 9 cm. long by 2 wide. The stab wound was just below the left eye, and the sight of the right eye was lost, but in the left eye vision, tension and visual field were normal. The tip of the blade had penetrated to the top of the right orbit, the cutting edge forward. Its presence was a casual discovery at the routine roentgenoscopy.

Hospitalstidende, Copenhagen

June 16, LVIII, No. 24, pp. 581-612

121 *Chronic Hemolytic Jaundice. (Den kroniske hæmolytiske Ikterus.) K. Faber.

June 23, No. 25, pp. 613-636

122 The Bordet-Gengou Bacillus Probably Responsible for Whooping-Cough. (Undersøgelser over Kighostebacillen.) I. Jacobsen and A. H. Meyer.

121. **Chronic Hemolytic Jaundice.**—Faber reports the details of a case in a girl of 17 whose father and four of the seven other children also present the typical picture of what he calls the Minkowski-Chauffard disease. In all the six members affected, of the family mentioned above, the spleen was enlarged, resembling in size and consistency the spleen of leukemia. Faber reports further another case, typical in every respect, in a girl of 18. All the other members of her family were healthy, without any signs of jaundice, anemia or splenic enlargement. In this and in his other case the red cells were destroyed in salt solutions that were almost isotonic, 0.64 and 0.7 per cent. The latter figure belongs to the sporadic case. In thirty-three healthy persons or patients with other diseases, hemolysis does not begin with a stronger than a 0.42 or 0.46 per cent. solution, and total hemolysis only with a 0.32 to 0.34 per cent. solution. This decreased resistance of the red cells is easily determined by preparing a set of test tubes with salt solution of graduated strengths and adding to each a few drops of the blood of the patient under examination. He appends the case histories of three patients with the familial type of the disease and treated by splenectomy. The fragility index of the blood was determined before and again three or four years after splenectomy, and also for the other members of the two families. The fragility index was found just as high at the later examinations; in all three hemolysis was evident in the 0.8 per cent. salt solution. Although the red cells were thus still abnormally fragile, yet the patients had been restored to clinical health by the splenectomy. The fragility of the blood is the primary factor in the disease and this is the anomaly that is inherited. The red cells were abnormally small in the cases examined for this. The spleen enlarges secondarily, but after its removal the red cells seem to be able to hold their own and hemolysis does not occur so readily. (Compare with recent editorial, July 17, p. 225.)

Hygiea, Stockholm

LXXVII, No. 10, pp. 513-576

123 Sources and Modes of Infection with Tuberculosis, Especially in Childhood. (Infektionskällor och infektionsvägar vid tuberkulos särskilt i barnaåldern.) G. Hedren.

No. 11, pp. 577-639

124 Terminal Drop of Temperature in Pulmonary Tuberculosis with Albuminuria. (Kritiska temperaturfall strax före döden, s. k. kollapstemperatur, vid lungtuberkulos; 107 dodsfall.) E. Danielsson.
125 *The Meiostagmin Reaction in Cancer. J. Jacobowsky.
126 Pseudomyxoma in Peritoneum of Man. E. Michaelsson.

125. **The Meiostagmin Reaction with Cancer.**—Jacobowsky applied the meiostagmin test in fourteen cases of cancer and two suspected and seventeen nonmalignant cases. The findings were conflicting and unreliable with four of the five antigens tested. The most instructive responses were obtained with an acid antigen; with this two out of four cancer cases were positive while all the six noncancer cases were negative.

Ugeskrift for Læger, Copenhagen

June 10, LXXVII, No. 23, pp. 923-988

127 *Determination of the Blood Pressure. (Blodtryksmaaling i Klinikken.) H. I. Bing.
128 *The Blood Pressure in the Obese. (Blodtryk og Adipositas.) E. E. Faber.

June 24, No. 25, pp. 1027-1056

129 Roentgenoscopy of the Normal Large Intestine. (Bidrag til den normale Tyktarms Rontgenologi I.) T. E. H. Thaysen. Commenced in No. 24.
130 *Bloodless Stretching of a Nerve Scarcely Possible. (Er ublodig Nervestrækning mulig?) F. Sadolin.

127. **The Blood Pressure.**—Bing reviews the history of methods for determining the arterial pressure, remarking that the cuff apparatus has proved most reliable, but that it would be a great advantage if a standard width, etc., were used to permit comparison. The systolic pressure can be determined by either palpation or auscultation, but auscultation is best for the diastolic pressure. In 138 men examined, all inmates of an institutional "home," the systolic pressure ranged from 115 to 145. In 160 in the hospital department it ranged from 128 to 158. All but 46 in the first group were under 70 and all but 84 in the second group. The normal systolic blood pressure seems to be from 100 to 130, but it is seldom within this range after 60.

128. **The Blood Pressure with Obesity.**—Faber recorded the blood pressure in 211 patients at the hydrotherapeutic institute. Over 52 per cent. had a pressure under 140 but in the others it ranged from 145 to over 200. In 182 cases there was no manifest kidney or vascular disturbance and among these the proportion was unusually high of cases with blood pressure of 145 to 160 (16 out of 59); 165 to 180 (9) and 185 to 250 (4). The pressure was often found high with functional neuroses and further with rheumatism, neuralgia and dyspepsia, for all of which overeating may be incriminated. It is possible, he adds, that the overeating may send up the blood pressure even when or before it has induced obesity. In most of the patients the high blood pressure did not seem to have any connection with the symptoms observed.

130. **Bloodless Stretching of a Nerve is a Fiction.**—Sadolin refers to the attempts to stretch a nerve in treatment of nervous trouble. Weights are applied for the extension, as a rule, and physicians are complacent over the benefits realized by the procedure. It is impossible, however, that the nerve can be really stretched. It does not lie taut, like a violin string, but lies loose, and the dragging on the limb from the weights merely takes up some of the slack. A nerve responds very readily to actual mechanical influences, as when a foot "goes to sleep" when it hangs pendent overlong, and the reaction when the elbow is lightly hit. If extension could be induced by weighting, the acrobats who hang by their feet or their hands would soon show the effects of stretching of their nerves. But nothing of the kind is observed in them. These and other facts cited apparently demonstrate that nonoperative stretching of a nerve is a fiction.